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Electric Lighting.—XXIII.

ARC LAMPS.

The problem of "feeding the carbons" in the production of the voltaic arc is one which has received even more study than that of generating electricity by means of dynamo-electric machines. From the year 1844, when M. Foucault brought out his crude hand regulator, to the present day, that field has fairly teemed with invention, as can be judged from the records of the patents granted in various countries for arc lamps. It is within the few years which have just elapsed, however, that the types and modifications of arc lamps have multiplied most wonderfully. Some inventors have alone produced as many as a dozen different kinds of arc lamps in this brief period, and in the multiplicity of kinds which prevails, all attempts to classify arc lamps according to distinctive characters must necessarily be involved in confusion. These few years also mark the dawn of the industrial era of the dynamo-electric machine as well, and while the growth and progress of each of these important factors of electric lighting has taken place independently of that of the other, an interesting parallel may be drawn between them. We have seen how, in the case of the dynamo-electric machine, the history of progress repeats itself, from Sinstedeu to Ladd, from Hjorth to Siemens and Wheatstone, and from Pacinotti to Gramme, and that in these instances the world each time passed by the very door of important results, not to return for several years. Strangely enough, with the arc lamp, the history of improvement, not to say of invention or discovery, has similarly repeated itself in more than one instance. Not to go further, we can allude to the principle of automatic regulation of the length of the arc by the action of a shunt, or derived circuit, from the arc circuit itself, an improvement of so much value and utility that we may consider the success of the arc light in industrial applications, to date from its introduction in the arc lamp. Several claimants came forward as the originators of the idea, and not less than three appear to have really conceived it and worked it out independently, at just about the same time, when all of a sudden a search among patent records elicits the discovery of other claimants, who anticipated these by nearly a score of years. And in the details of construction or the adaptation of mechanical devices, the same anticipation of later inventions has likewise been found; in some of the old specifications of patents, which at their time even, did not attract much attention, and which have long since passed into oblivion, there may be found the germ of many a valuable idea which has perhaps again become known to the public since, by the efforts of some later inventor, who conceived it anew, apparently without the slightest knowledge of its antecedent, for it is only within a couple of years that the history of the art has been accurately traced. Many of these old ideas are possessed of some value, and show a large amount of inventive skill; they only lack in mechanical perfection, and doubtless more than one of these pioneer electrical inventors would have secured fame and fortune had he lived in the present era of electric lighting, and could he have benefited from the present knowledge of the science.

As it was, in the absence of a cheap and efficient generator of electricity, the electric light scarcely attracted attention in any other sphere than that of curiosity, for it was scarcely more than a laboratory experiment, and for lack of encouragement one after the other of these ideas, many of which might have led to important improvements, were passed by and neglected, until they had become entirely forgotten. This appears to have been particularly the case in England, where the electric light scarcely received public attention, while, strangely enough, the number of inventions relating to it was greater than it was in France or elsewhere, at the same time. In France, the arc lamp received more attention, from physicists particularly and some of the types of regulators which were then devised received at least the benefit of a trial; and on a few of them improvements were carried out until a certain degree of perfection had been attained. Three lamps have been thus identified with the early days of the electric light, viz., Foucault's, Serrin's and Duboscq's; and, if we look at the question from its practical side, they are in fact about all that deserve mention in detail, for it is only since the advent of the Gramme machine, and of its various modifications, that the arc lamp can be said to have really entered on its career of development. All of the lamps which have come into use, the world over, have been produced since this period, and, in fact, within a few late years.

But, although these three lamps were about the only ones that received the sanction of practical use, it may be interesting to glean some brief references to a few of the more original inventions. It would be superfluous to attempt to refer to all of these earlier ideas, since many of them do not possess much value, and, besides, the principles involved in the regulation of the arc can be well enough understood from the consideration of a few only, reserving the space for the more modern types, which we will have occasion to refer to, as we take up each particular system in turn.

The first regulating mechanism appears to have been produced by one Thomas Wright, in England, in 1845. The device consisted in a series of discs touching each other at their circumference, and which were separated from mutual contact after the current had been established, the

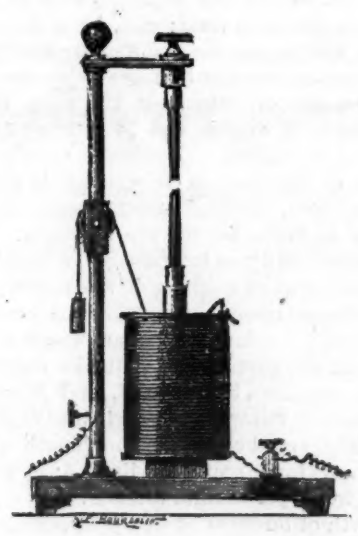

FIG. 73.

discs being rotated by clockwork. As a part of the discs formed one pole and the remainder formed the other pole, a small arc was established at the edge of the discs.

It need scarcely be said that the device is entirely impractical, and for reasons quite obvious. Even if the impossibility of keeping the discs from wearing unevenly could be removed, the shadows cast by the discs themselves would intercept too much light.

In 1847 Mr. W. E. Staite produced an arc lamp in which a clockwork mechanism acted on a thread around the lower carbon-holder so as to cause it to ascend. The motion was controlled by an electro-magnet, which was in the main circuit with the arc. This lamp was consequently only adapted to be used singly in a circuit. When the arc was short the magnet acted more energetically, and prevented the escapement of the mechanism from operating; but evidently, as the arc lengthened, the current in the whole circuit weakened, and the electro-magnet weakened also, and released the feeding mechanism. This lamp could not start itself, however, because there was no contrivance that would automatically separate the carbons on introducing the current. He subsequently introduced the rack and pinion instead of the screw thread and worm.

In 1848, however, he described, among other improvements, a solenoid with a hollowed core, through which passed the lower carbon rod. Normally, this carbon rod was raised by a weight and touched the upper carbon, but the action of the solenoid on passing the current caused the hollow armature to catch the rod by a spring pawl, which caught into teeth on it, this spring pawl being brought into action only at a certain stage of the downward motion, on account of a triangular projection which engaged it, and only released it when the armature, was pulled into the solenoid a slight distance. The action of the solenoid accordingly caused the carbons to separate, and to form the arc; as the arc lengthened the solenoid weakened, and the armature and carbon rod both moved upward until the triangular projection released the spring pawl and allowed the carbon rod to move up a few teeth, when, by the increase of current which resulted from the shortening of the arc, the solenoid immediately pulled back again as before. This form of lamp was in reality possessed of all the features which go to make a successful arc lamp; and as it was, only a little mechanical perfection would have rendered it practical. This arrangement, in fact, recalls somewhat the Brush lamp, with its hollow iron core playing inside a helix and moving "axially." If Mr. Staite had placed his mechanism so that it would operate the upper carbon, then the gravity of the carbon and of its holder would have brought it into contact with the other without the use of a weight and pulley. The modern lamp is constructed on this "gravity" principle, the exceptions being very few. With this improvement, and by providing it with a shunt magnet to make it automatically regulating, the Staite lamp would no doubt work very successfully in series. Mr. Staite also produced other modified forms of arc lamps, though none possess as much interest as these two. Of the inventions of Mr. Staite it should be said that they show a large amount of inventive ability. Mr. Staite must, indeed, be looked upon as one of the ablest of the pioneers who have worked in this field. We shall find that he was also one of the first to turn the incandescence of conductors to account in the production of light, and one cannot but be surprised to observe how nearly he came to making a good arc lamp and a good incandescent lamp, even at that early day.

In 1848 M. Archereau, in Paris, designed a new regulator which attracted some attention. (Fig. 78). The upper carbon was fixed, as in the Staite lamps, and the lower one was the moveable one. It was attached to an iron rod playing up and down inside a solenoid that formed a part of the main circuit. This weight, and the weight of the carbon were balanced by another weight, attached to a cord which passed over a small pulley, as shown in the figure. This weight was sufficient to move the armature of the solenoid upward, and bring the lower carbon in contact with the upper one. On passing the current, the action of the solenoid was to pull its armature downward, and consequently to separate the carbons and establish the arc. The power of the solenoid was made so it would pull them apart to the right distance; for instance, had it been composed of too many turns of wire, it would have been apt to pull the carbons far enough apart to break the arc before the weakening of the current in the general circuit, in consequence of the lengthening of the arc, would have reduced its attractive powers sufficiently to make a balance between it and the weight, while with a two weak solenoid, on the contrary, the action might have been insufficient to cause the separation of the carbons. This lamp, although exceedingly simple and ingenious, was not as practical as might at first be supposed, because the attractive effect on the armature not only varied considerably with the extent to which the iron rod penetrated into the solenoid, but this difference of equilibrium was still more increased by the consumption of the lower carbon, which tended to increase the action of the weight counterbalancing it. It is true that a chain could have been attached to the iron armature, which would have been picked up from the bottom of the cavity of the solenoid, link by link, as the carbon worked up in burning, and thus the weight might have been kept nearly balanced, as had been proposed by Mr. Staite. The great difficulty however, was that the iron core was liable to tip laterally one way or the other, specially when the carbons were nearly consumed and the iron core had ascended almost entirely out of the solenoid. To remedy this, a central pin or guide, on which the core could move up and down, might have been of value, but these improvements would have complicated the arrangement.

C. O. M.

Telegraphs.

THE PROGRESS OF TELEGRAPHY.

The first of a current series of six lectures at the Institution of Civil Engineers on the applications of electricity was on "The Progress of Telegraphy," by Mr. W. H Preece, several of whose lectures have already been published in this journal.

Telegraphy, said Mr. Preece, is the oldest practical application of electricity. It grew about the railway system, and was rendered a practical agent by the foresight of Robert Stephenson, I. K. Brunel, Joseph Locke and G. P. Bidder, who were its godfathers in England. Electric currents are, as a rule, maintained for telegraphic purposes by the combustion of zinc, and in the innumerable forms of batteries, the conversion of zinc into sulphate of zinc is the root of the transformation of energy into that form which was utilized as electric currents. There are three forms of battery in use in the British post-office telegraph system, and in the following numbers:

	Cells.
Daniell	87,221
Leclanché	56,420
Bichromate	21,846

Every administration has its own adopted form, differing in design, but based on one or other of these types. Magneto-electricity is applied for some forms of apparatus, and dynamo-machines are occasionally utilized to supplement batteries. The various terms electromotive force, resistance, induction and current, though measurable in definite units, have not yet become household words; but, having been admitted into commercial, legal and parliamentary lore, they will soon be as familiar as feet, gallons or pounds.

Electric currents are conveyed from place to place either overground, underground or submarine.

Overground.—Wooden poles preserved in creosote are employed in England, but iron poles are extensively used in the colonies. The conducting wire is almost universally of iron, but copper wire is much used through smoky places where iron is liable to rapid decay. Phosphor-bronze wire is under trial, and is a very promising material, as it possesses the conductivity of copper with the strength of iron. The improvements made in the quality of iron wire have been very great, and it conducts now fully 50 per cent. better than it did a few years ago. Electric tests have had a marvelous effect upon the production of pure metallic conductors; copper has improved in a greater ratio than iron, and samples have been produced better even than the standard of purity. The insulators remain principally of porcelain, and their forms vary nearly with the number of individuals who use them. The only improvement of any value recently made is one which facilitates the very necessary process of cleansing.

Underground.—Wires are almost invariably carried underground through towns. Copper wire, insulated with gutta percha, encased in iron pipes, is the material used. There are 12,000 miles of underground wire in the United Kingdom. There is a great outcry for more underground work in England, owing to the destruction to open lines by gales and snow-storms; but underground telegraphs, wire for wire, cost at present about four times as much as overground lines, and their capacity for the conveyance of messages is only one-fourth; so that overground are, commercially, 16 times better than underground wires. To lay the whole of the post-office system underground would mean an expenditure of about £20,000,000. Hence there is no desire to put wires underground except in towns. Besides snow-storms are few and far between, and their effects are much exaggerated. Of the numerous materials and compounds that have been resorted to for insulating purposes, gutta-percha remains the oldest and the best for underground purposes. It, like all other materials used for telegraphy, has been improved vastly through the searching power that the current gives the engineer.

Submarine.—The past ten years has seen the globe covered with a network of cables. Submarine telegraphs have become a solid property. They are laid with facility and recovered with certainty, even in the deepest oceans. Thanks to such expeditions as that of H. M. S. Challenger, the floor of the ocean is becoming more familiar than the surface of many continents. There are at present 80,000 miles of cable at work, and £30,000,000 have been embarked in their establishment. A fleet of 29 ships is employed in laying, watching and repairing the cables. The Atlantic is spanned by nine cables in working order. The type of cable has been but very little varied from the first made and laid between Dover and Calais; but the character of the materials, the quality of the copper and gutta-percha, the breaking strain of the homogeneous iron wire, which has reached 90 tons to the square inch, and the machinery for laying have received such great advantages that the Telegraph Construction & Maintenance Company laid a cable across the Atlantic last year in 12 days, without a hitch or stoppage.

Ideas are conveyed to the mind by electric signals, and, in telegraphy, these signals are produced at distant places by two simple electrical effects: (1) That a magnetic needle tends to place itself at right angles to a wire when an electric current passes through it, and (2) that a piece of iron becomes a magnet when a current of electricity circulates around it. An innumerable quantity of tunes can be played on these two strings. Various companies were established at different times to work certain systems, but when the telegraphs were absorbed by the state, the fittest were selected to survive, and their number consequently declined.

The A B C instrument is the simplest to read, for it indicates the letters of the alphabet by causing a pointer to dwell opposite the desired letter. There are 4,398 in use. Its mechanism is, however, complicated and expensive, and it is being rapidly supplanted by the telephone. The needle instrument is the simplest in construction, but it requires training to work it. There are 3,791 employed by the post-office, and 15,702 among different railway companies. As a railway instrument it is the simplest, cheapest and most efficient ever devised. The Morse instrument, of which the post-office possesses 1,330, records its letters in ink, in dots and dashes on paper tape, and, like the needle and A B C, appeals to the consciousness through the eye; it also indicates the letters of the alphabet by sound, and thus utilizes the organ of hearing. Sound-reading is gaining ground in England with great rapidity. There are now 2,000 sounders, while in 1869 there were none. In America scarcely any other instrument is used, but on the continent of Europe there is scarcely one.

Acoustic reading attains great perfection in Bright's bell instrument, where beats of different sound replace the dot and dash of the Morse alphabet. Sound-reading is more rapid and more accurate than any system of visual signals or permanent record. In fact, no record is kept in England, for the paper tape is now destroyed as soon as it has been read. Errors are of course inherent to all systems of telegraphy. A telegraphist cannot see what he writes, nor hear what he says, and who is there that does not make mistakes, whose eye follows his pen, and whose ear takes in his own words? The Hughes type instrument, which prints messages in bold Roman characters, is much used on the continent; it is in fact recognized as the international instrument, but it has had to give way in England to a more rapid system of telegraphy. It is, however, solely employed for the continental circuits by the Submarine Telegraph Company. All long cables are worked by Sir William Thomson's beautiful siphon recorder.

In ordinary working only one message can be sent in one direction at one time, but by a simple and ingenious contrivance, by which the neutrality of opposite currents is utilized to convey signals, duplex telegraphy is rendered possible, so that two messages can be sent on the same wire at the same time; and, by a still further improvement, where currents of different strength are utilized, four messages are sent on one wire—two simultaneously in opposite directions—at the same time. There are in England 319 duplex and 13 quadruplex circuits at work.

The acme of efficiency in telegraphy is attained in the automatic system, in which manual labor is supplanted by mechanism in transmitting the messages. There are 71 circuits worked by these instruments, and 224 instruments in use, and a speed of working of 200 words per minute is easily maintained upon them. With the hand alone from 30 to 40 words per minute is the maximum rate attained, but by automatic means the limit is scarcely known. Since this system can be duplexed, and in many cases is so, 400 words per minute on one wire are easily sent. By the use of high-speed repeaters, the length of circuit for automatic working is scarcely limited; it would be easy to send 100 words per minute to India.

The growth of business since the telegraphs have been acquired by the state is enormous; 126,000 messages per week have grown to an an average of 603,000; but the mileage of wire has not increased in anything like the same proportion, the excess of traffic having been provided for by the great improvements made in the working capacity of the apparatus. In 1873 the average number of messages per mile of wire was 147; it is now 256. It is in press work that the greatest increase has taken place; 5,000 words per day at the time of the companies has grown to 934,154 words per day now. Three hundred and forty million nine hundred and sixty-six thousand three hundred and forty-four words of press matter were delivered in the year ending March 31, 1882.

The development of railways has necessitated a corresponding increase in the telegraphs required to insure the safety of the traveling public, and while 27,000 miles of wire in England, Scotland and Wales were used for that purpose in 1869, at the end of December, 1882, the total had increased to 69,000 miles, equipped with 15,702 instruments, against 4,423 in 1869.

The growth of business is equally discernible in the great cable companies. In 1871, the number of messages dealt with by the Eastern Telegraph Company was 186,000; in 1881 it was 720,000. This growth is equally striking in all civilized countries, and even in Japan 2,223,214 messages were dispatched, of which 98 per cent. were in the native tongue. The mode of transacting the trade of the world has been revolutionized, and while wars have been rendered less possible, their conduct has been expedited and their penalties alleviated.

SHOCKING.—An exchange says the railroad of the future will be run by electricity. Then there'll be no boiler explosions, but "shocking" accidents will be more liable to occur than ever.—*Philadelphia Herald.*

Progress of the Electric Light in England.

An American electrician, who has been spending a short time on business in London, and who is a close observer, sends us an account of the present condition of the electric light in England, which will be found of much interest to those connected with the electric light business in this country. In future letters he promises to discuss underground telephone and other matters of interest to American electricians. Of the electric light, he says:

The electric light, both arc and incandescent, has far more to contend with before it can be successfully introduced here than on our side of the Atlantic; in fact, the electrical 'craze' of a year ago seems to be entirely over, and of the many companies formed at that time some have already wound up, and others are on the verge of so doing. Some well-informed electricians here think this depression in electrical matters only temporary, and believe that in six months or so there will be another boom.

Competition, no doubt, has had much to do with this state of things, but there are several other reasons why the electric light is not more generally used here. One is that the extreme conservatism of the people renders the introduction of new inventions very slow, and makes the use of them after their adoption only limited. Then, again, it is more difficult to compete with gas, which is much cheaper here than in New York. The price in London is 87½ cents per 1000 feet. Compare this with $2.25, the New York price, and the difference is no small item. Another thing which adds to the general expense of street lighting is the underground wires. These are necessarily costly, on account of insulation and the provision made to prevent mechanical injury.

I saw a sample of an underground main. It consisted of twenty copper wires, of about No. 12, twisted together like a rope, making a diameter of three-quarters of an inch. The insulation which covered this was about three-sixteenths thick, making a diameter over all of nearly one and one-quarter inches. This insulation is a bituminous compound, similar to that known as the "K. K." The expense, however, does not end here, as the main has to be put in an iron pipe, a trench dug through the street (which is no easy matter in these artificial stone pavements), and then covered up and the street replaced as it was. I was unable to learn the cost of this undergound main, but it must be something enormous.

The gas companies are a powerful monopoly here, and are in league with the municipal authorities, which so hedge the electric light about with restrictions as to almost prohibit its use. As though all this were not enough to keep off the 'blarsted innovation,' as a gas man calls it, inventors seem to have been racking their brains lately in getting up improvements on *gas burners.* I saw on exhibition at the Crystal Palace as many as two dozen different styles of gas burners, all intended to improve the light and burn less gas.

Notwithstanding these obstacles, however, electric light has a good footing and, like all important inventions, has come to stay. But its growth will be slow for the above reasons.

One novel use to which the incandescent is put here is at the Savoy theatre, in the play of *Iolanthe.* I went to see this, as it involved an application of the light I had not seen and might prove interesting. It did. Some thirty fairies have each a light fixed on their heads to represent a star; the wires run down their backs to a galvanic battery concealed about their clothing or under their hair, which hangs loosely down.

The effect was very fine, as far as it went; but the arrangement could not be considered a complete success, as some of the lights went out at the most important parts of the act, one of them being that of the Queen—the most prominent. One other was particularly noticeable, from the fact that just after her light went out (she being in a kneeling posture, both bare arms stretched out toward the ceiling, singing at the top of her voice), she suddenly uttered a whoop, both arms flew behind her back and proceeded to arrange something. After adjusting the 'trouble,' she resumed her song and posture, but looked red in the face and uncomfortable. I suspected that a short circuit through some part of the fairy was the cause of these antics. It may have been bad for the fairy, but it was highly amusing; none the less so from not being down on the bills.

I hardly think that this use of the light will become popular, as it doesn't always work. With respect to the fair sex, I have always noticed that when science and woman are coupled together, you can't always depend on good results.

The Savoy theatre is very successfully lighted throughout by the incandescent. The temperature remains about the same, whether the lights are turned up or down, and the light is a great improvement over gas. The "bulbs" are covered with ground glass globes, to temper the glare. The whole affair is run by Siemens Bros. There are several electric lights exhibited at the Crystal Palace, but I have seen none there that could compare in brilliancy and steadiness with those at our American Institute Fair, last Fall, either arc or incandescent; in fact, the best lights I have seen in London were those in practical use—the Swan incandescent at the Savoy, and a row of arc lights through ueen Victoria street. It took me some time to find out

what light this was, as there was no name on the globes (the usual place). But as they were without exception the best I had seen in London, I made it my special business to find out. I finally found the name low down on the posts —"The Weston-Maxim"—familiar names in the business in New York, where this light originated.

Fundamental Principles of Electrical Science.

BY P. H. VANDER WEYDE, M. D.

VI.

Our first series of experiments, of which the leading ones were discussed on page 165, was intended to demonstrate that under certain conditions friction may develop a peculiar state of the rubbed bodies, consisting in the development of a force called electric, which will manifest itself by attractions and repulsions. The second series of experiments, explained on page 179, is intended to demonstrate that there are two kinds of this force, which are easily distinguishable by the proper tests; while the third series of experiments, explained on page 195, serves to prove that the development of this force consists in a separation of the two kinds of opposite electricities; neutralizing one another in the ordinary state of bodies, or (when promulgating the unitarian doctrine of Franklin, explained on page 147), charging one body with an excess of the natural amount at the expense of another body from which this natural amount is withdrawn, causing there a deficiency, which is expressed by the negative sign —, while the excess is expressed by the positive sign +.

We will now proceed to a fourth series of experiments, intended to prove the most remarkable of all the properties of the electric force, more hidden from superficial investigation than any of the other properties, but at the same time the most remarkable and practically useful. It is that power by which the mere presence of an electrified body causes a certain electric condition of other bodies in the neighborhood without communicating any electricity to them. It is called in English "induction;" is known to the French as "electricity by influence," and to the Germans as "electricity by division." That all these terms are appropriate will become clear later on from our explanation. Inasmuch as these experiments, in order to be fully satisfactory and convincing, require a more abundant source of electricity than can be obtained by rubbing a glass or vulcanite rod, we will first explain the construction of the friction electric machine. We advise students of electrical science to undertake for themselves the production of electricity by this method, as it is a comparatively easy task. The honor of constructing the first electric machine producing frictional electricity on a larger scale than we have described thus far, belongs undoubtedly to that famous and indefatigable experimenter Otto von Guerick, burgomaster of Magdeburg in Germany, the inventor of the air-pump. He published a description of it in Amsterdam in 1672. It consisted of a globe of sulphur cast around a spindle and revolved by a a crank; for friction he used the hand. Hawksbee used a hollow glass ball, and placed it upon a kind of lathe, so as to obtain a more rapid rotation. He also used the hand for friction, and published a description of his experiments in London in 1709.

Hansen, in Leipsic, Germany, appears to have been the first to introduce electrical machines as a part of philosophical lecture apparatus. This appears from a history of electrical progress published there in 1743.

Winkler, of the same city, used four revolving glass globes, rubbed by the hands of two persons; while Giessing introduced in place of the hand leather rubbers, which were soon adopted by others.

About the same time Wilson published the description of a machine which was more convenient in its use than any of the preceding ones. It consisted of a glass cylinder, revolved on a horizontal axis, while the rubbing arrangement was below, and a piece of metal on top served to collect the electricity from the glass which passed under it. During succeeding years many variations of this machine were contrived, as were also many variations of the globe machines, which, however, soon fell into disuse, as the cylinder machines furnished a much more available surface.

In next issue we shall illustrate and describe different forms of electrical machines in detail.

The Edison Installation at Haverly's Theatre, Chicago.

For some months past the Western Edison Electric Light Company has been engaged in installing the Edison light in Haverly's Theatre, Chicago, on an extensive scale, and on April 9 the first exhibition was given under the direction of the engineer of the company, Mr. P. D. Johnston. Gen. Anson Stager, president of the company, being among those present. There are in the theatre 637 lights in all, operated by three dynamos—one for the vestibules and entrances, one for the stage, and one for the auditorium. There is not a gaslight in the house now, every jet having been replaced by the Edison globes. There are forty movable bunch lights for use on the stage and forty round lights. Then there are five sets of border lights above the stage, two of which contain thirty-five lights each and the other three twenty-five lights each. The chandelier in the centre of the auditorium, which was manufactured at a cost of $500, bears seventy-four burners, and there are 160 others distributed through the auditorium. In the vestibules and entrances there are fifty-three lights, and the dressing-rooms and stage are also lighted.

Below the sidewalk in front is the new engine, built expressly for the plant, with 200 revolutions per minute. Connected with it are lamps which denote the candle-power used throughout the house. In the first right stage entrance are twelve switches and six resistances for the regulation of the lights. By means of these the lights in any part of the house can be lowered, raised, or entirely extinguished. In the dressing-rooms the lights are independent and can be turned on and out the same as gas. Each burner is warranted for 600 hours, and will last three or four months in a theatre unless broken. Of course this light does away with all danger from fire.

The light given is a soft and mellow one, resembling daylight. One of the actors, who has sung in the Savoy Theatre, London, where the electric light is used, was asked if it spoiled the appearance of the "make-up," but said the same lights were in the dressing-rooms, and if an actor "made up" by the light he would look all right on the stage. The expense of putting in this light has been $15,000 to Manager Haverly, but he was determined to do away with gas, and he has done so. There is no doubt but that the light will be a great success, and every one is enthusiastic over it.

The Exigencies of the Electrical Trade.

BY T. C. FRENYEAR.

The rapid increase of a business, especially where manufacturing is an important factor, is always, except where the enterprise is confined to one, two or three concerns by patents, government restrictions or otherwise, attended by complication, an unhealthy competition and odium against the trade, which finally reacts to its purification.

The growth of the electrical business during the last few years has been almost unprecedented, at least it has been remarkable. While each concern stuck to its own specialties, and only one or two attempted to supply the trade with everything, money was made and the companies were prosperous. But the result was inevitable that each concern, receiving orders for other goods as well as for their own specialties, should be drawn—half unconsciously, perhaps—into a general supply business. Now the electrical interests are passing through a transition state from childlike simplicity to a full-grown and well-established character. But as a child is not left to mature of itself but is trained and taught, so it is well for us to bring to our business reasoning and forethought which shall pilot it across to a foremost place among American industries.

There are some difficulties presenting themselves at the present time which ought to have not only our attention but our hearty efforts in order to bring about a change. Electricity is a charming study, and there has been a universal craze for electrical playthings, extending all the way from the primary school boy to the professor of physics. These amateurs, as a rule, will not pay much for their fun; so, with the natural suppleness of a new industry, we have made things "cheap." Probably, however, the growing competition in professional fitting—professional, indeed, but not because competently done—has had more influence toward the manufacture of inferior and almost worthless goods than anything else. It is a question if in any field it is wise to get up "cheap" articles—cheap at first, but costly in the long run—to suit an unskilled and unscrutinizing multitude; but so far as regards our business there can be no question on that point in the mind of an honest, thoughtful man. The most perfect electrical machine possible is not too good. The future reputation of the business and especially of the houses in particular depends upon honest, faithful, skillful work in our factories, together with the same spirit in the office. We can't expect always to be able to pull wool over the eyes of our country customers; they are on the alert and fast educating themselves, and unless we give them firs-tclass goods, they will encourage an opposition which will. Then there should be a combined effort to raise the standard of workmanship which shall be demanded of our trade, to make a consequent advance in the quality and finish of our goods, and in general to encourage that policy which holds that the best is the cheapest.

The second great need of our business (I speak not personally or for my company, but for all concerned) is a trade union, and, wherever possible, combination or pool rates. There is now enough combination on wire, but if some of that combination were spread around among other goods, it would be more beneficial. As it is now, an amateur can buy five pounds of annunciator wire at as low a figure proportionately as that charged a company in the trade by the ton. The difficulty in the way of forming combination prices on unpatented or even some patented goods is that there are little differences here and there in form, quality or finish, which mark the individuality of the manufacturers. But could not a well-formed trade union, by competent committees, either decide upon some one form as absolutely best and most practical, or fix schedule rates upon each style, which should be equitable to all? It is evident, when that unhealthy competition which compels a firm to sell its first-class goods as low as a neighbor sells such inferior artioles obtains ground, that something must be done about it. It is for each one interested and all together to decide what this something is. My object is to make the subject more prominent, and perhaps to start a discussion which may produce definite results.

One thing is clear, that we owe it to ourselves, to our business, and to American industry, to make our goods as perfect and on as good a plan as possible, and that some concerted action be taken to change our present ruining competition into that other kind of competition which is the life of trade.

A Change in the Postal Telegraph Company.

It is said that a change is about to be made in the Postal Telegraph Company, which will, it is claimed, contribute largely to the success of its plans. The change of base of the affairs of the company is caused by the sale of the stock owned by Mr. John B. Alley, of Boston. Mr. Alley owned a controlling interest in the company, and has always evinced a great interest in its affairs, but being advised lately by his physicians to give up all active business, decided to sell his stock, which has been purchased by a syndicate of capitalists of New York and Boston. Their names have not been made known as yet, as the negotiations have not been fully completed. Vice-President Henry Cummings says that he does not think that there will be a change in the executive officers of the company, except in that held by Mr. Alley, although a new board of directors will probably be chosen. With the new administration, Mr. Cummings says that additional lines will be put up immediately in all the larger cities of the United States. The capitalists who had taken hold of the matter, he adds, are men whose sole interest was for the welfare of the Postal Telegraph Company.

Canadian Notes.

The Canadian Electric Light Company has had its act of incorporation amended.

The new telephone company in Montreal is already soliciting subscribers and meeting with very fair success.

Some representatives of the Globe Telephone Company, of New York State, are prospecting in the vicinity of Montreal.

Many new bills for the incorporation of telegraph, telephone and electric light companies have been introduced at Ottawa.

The Bell Telephone Company of Newfoundland is applying to the Legislature of that Province for an act of incorporation.

The Newfoundland local legislature has appropriated $5,000 this year for the maintenance of local government telegraph lines.

Mr. N. W. Bethune, superintendent of the G. N. W. at Ottawa, says the company has done a large government business this season.

Manager Graham, of the G. N. W. Montreal office, will return about the end of this month from his trip to Florida in greatly improved health.

Mr. J. Dakers, ex-secretary of the Montreal Telegraph Co., and family will spend part of the coming summer at the Caledonia Springs Hotel.

The St. James Club handsomely entertained Mr. Edison while on his recent visit to Montreal. The St. James ranks with the Union Club of New York.

The Great N. W. Co. sent from the Parliament Building, Ottawa, 215,169 words of press matter on Friday night last, when the Budget debate was in progress. There were seven wires in constant operation between Ottawa, Montreal and Toronto, and two between Ottawa, Hamilton and London.

The telegraph and telephone fraternity are well represented in athletic circles in Montreal. Mr. C. S. Sclater, secretary of the Canadian Telephone Company, is secretary of the Montreal Toboggan Club; a son of Mr. H. P. Dwight, of Toronto, general manager of the G. N. W. Co. is one of those selected to go to Europe on the lacrosse, team, and Angus Grant, district superintendent of the G. N. W., is president of the Montreal Snow Shoe Club.

HOOPING IT UP.—It is the cooper who has the "staving" time; he is always "hooping it up."

ELECTRICITY CANNOT KILL A RATTLESNAKE.—The Southern rattlesnake, as well as his Northern relative, is capable of sending a thrill through the nervous system of man by the mere sound of his rattles. He is himself of a very low nervous organization. The writer once submitted a moccasin to the influence of electricity, and though the entire charge of a battery of fifteen "Leyden jars" was passed through him, no other effect was produced than to make him raise his head and hiss, and yet this charge would have killed a man or a horse instantly.

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AND
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W. J. JOHNSTON, Editor and Publisher.

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CONTENTS.

ILLUSTRATED ARTICLES: PAGE.
Electric Lighting, XXIII....241
EDITORIAL:
The Underground Problem....244
MISCELLANEOUS:
Telegraphs....242
Progress of the Electric Light in England....242
Fundamental Principles of Electrical Science....243
A Change in the Postal Telegraph Company....243
The Exigencies of the Electrical Trade....243
The Edison Installation at Haverly's Theatre, Chicago....243
Canadian Notes....243
The Electric Light Abroad....245
The "Portable Electric Light Company" Denied the Use of the Mails....245
Brush Electric Light Companies in Convention....245
Electric Service in Every-Day Life....246
Dr. Holmes' Poem by Telegraph....246
COMMUNICATIONS:
Chicago Notes and Personals....246
DEPARTMENTS:
The Electric Light....246
Telephone Department....246
Dashes Here and There....247
New York City Items....248
Personal....248
Deaths....248
Electrical Patents Issued....249
Business Notices....249

NEW ADVERTISEMENTS.

In the growth of our paper in circulation, size and general improvement, the value of its columns for reaching those engaged in electrical pursuits or interested in electrical matters has not failed to be appreciated by advertisers. In order to better enable our readers to notice anything new which advertisers may have to offer them, we now give in this column a list of new advertisements as they appear in each number. The following will be found in to-day's issue:

PAGE.
GARSIDE & CO.—Illustrated Catalogue Free....249
OTTO MAURER.—Magical Apparatus....249
BIJOU PHOTOGRAPH CO.—Photographs for One Cent Each....249
GARSIDE & CO.—The Improved National Favorite Watch....249
PATTEN & CO.—Ladies' Fancy Work....249
AGENTS' SUPPLY CO.—A Free Gift....249
AMERICAN SPIRAL TELEPHONE WIRE CO.—Spiral Telephone Wire....249
G. C. SCOTT.—Patterns for Turkish Rugs....249

RE-ARRANGED ADVERTISEMENTS.

DAVIS & PROAL.—Faure Accumulators or Electric Storage Batteries.250

THE UNDERGROUND PROBLEM.

The problem of underground wires is becoming one of greater interest every day. Many years have elapsed since the subject was first broached by public authorities, but whatever measures may have been determined upon then, they seem to have been waived or gone by default, probably because public sentiment was not strong enough in their favor to overcome the pressure which the companies interested may have brought to bear against them. But within the last two or three years, the multiplication of lines and networks of wires of all kinds, which has followed the progress of telegraphy, and more especially the growth of telephony and of electric lighting, has increased the inconveniences of air lines to such a degree, that public sentiment is beginning to pronounce itself emphatically in favor of underground wires. Of late, the question has received the attention of legislators in various States, and in Chicago, Philadelphia and other cities, even the municipal authorities have come forward with a decree for an immediate remedy. These efforts to compel the companies to place their wires underground, are symptoms, more or less urgent, that the time for action on the part of the latter has arrived. A move is now being inaugurated in this city to bring about concerted action between the various companies in dealing with the question, as is shown by a circular from "The Committee on Underground Communication." This circular, of which a copy has been sent us, seems to have emanated from the offices of the Gramme Electrical Company, for it bears the names of the seven electric light companies constituting this "combination," and the name of Col. R. R. Hazard, the president of this company, is announced as the chairman of the committee.

It is stated in the circular that twenty-one corporations in the city of New York are using lines of the various kinds for the transmission of electrical currents, eleven being telegraph companies, including fire alarm and police telegraphs, four being district messenger companies, one a telephone company, and five electric light and power companies. The circular then proceeds to show that while several of these companies possess underground rights, notably the Edison Company, which has laid conductors under sixteen miles of streets, yet it is not expedient for all these companies to follow each its own course independently on account of the cost and inconvenience which would necessarily result from such a procedure. The circular aims at an ideal system, in which conductors adapted to all classes of requirements may be laid together, so that not only every facility may exist for each company to reach the points where its service is in demand, but so that all new installations of whatever character may be promptly fitted, without delay, undue cost, or without necessitating any disturbance of the streets. The circular states furthermore, that although no existing system can attain all these results, yet there are about three hundred and fifty patented devices of more or less value, some of which may be useful and essential in the development of an effective working system. The object of the circular is to invite a meeting of the representatives of the various corporations for the purpose of forming a general committee to determine the value of these devices and whether a system cannot be contrived from them, or whether, in any case, a line of co-operative action may not be agreed upon that would diminish the cost of installation to each company.

We are glad to notice the beginning of this move, which, everybody will agree, is in the right direction. An underground system would be as much a boon to these companies as it would be a relief to the public, and this should be well borne in mind by many who are wont to trace the indifference of the companies to selfish interests. Undoubtedly, it must be granted that the proposed change would bring upon them considerable inconvenience, and in some cases not a little expense. Still, they would hail the advent of a good, practical, underground system with satisfaction. They realize perhaps better than anybody that theirs is but a temporary structure; for the constant annoyance from breaking wires, decaying poles, false circuits from accidental contact of contiguous lines, is also a great source of expense to them. In most cases it necessitates the employment of a strong force of men to keep the lines in repair, and in fact, it may be said that each line is continually being repaired at some point or other,—it is being renewed piecemeal, so to speak, and the average duration of a line will scarcely extend over ten years, while the resulting depreciation of material will not fall very short of seventy-five per cent. It is pleasing to observe that the intricate questions involved are now in a fair way to receive the study they deserve, and which is essential to success in the objects to be attained. It is only in this manner that the facts which underlie the problem can become known. It is indeed high time that systematic attention were given to such an important matter. We will watch the developments of the case with interest, and shall be prompt to keep our readers informed about them. The circular announced the meeting for Friday, the 20th inst., at 11 A. M., in the Gramme Company's offices, 115 Broadway, this city. We shall give a report of the proceedings next issue.

THE evolution of telegraph and telephone lines is assuming the phase of a question of "the survival of the fittest," between aerial and underground cable systems. At present, at least in this country, the odds appear to be in favor of overhead cables. On the one hand the largest telephone corporation has declared against the present feasibility of an underground cable system, and on the other the leading telegraph company, ignoring an ordinance to enforce the burying of its wires throughout the city of Chicago, is seeking to meet the well-grounded public objections to the present cumbersome method of carrying the wires, by grouping them into aerial cables. Of this important step Superintendent Clowry, of the Central Division, says:

"We intend putting up the cables as fast as possible and clean out at least all the trunk lines down-town, There are, however, a great many wires running into buildings for tickers and private lines that can not be removed. But we propose to cable all the wires we can—have boxes on the poles wherever practicable, and run wires for the cables on the roofs into buildings. Each cable contains eighteen wires, and as they will be fastened to short arms, four of the cables will do away with seventy-two separate wires and twelve arms—quite a bunch to remove. The four cables will be little or no obstruction. The present poles will remain for a while, but, ultimately, none over thirty-five feet high will be used at the street corners—shorter ones will be put in the middle of the blocks—and the cables will be so attached to the arms that they can be dropped into the street when it is necessary to raise a fire-ladder against a building."

As we have noted elsewhere, the telephone company in Washington, a city which particularly prides itself upon the fine appearance of its streets, is about to take similar action in regard to its wires.

It does not appear, however, that these aerial cables find much favor, at least in the sight of the municipal authorities of Chicago, for at a meeting of the City Council on Monday evening, April 16, an order was passed directing the Mayor to cause the cables to be removed at once. We are inclined to question the wisdom of this action on the part of the Chicago City Fathers. If it is at present impracticable to run wires underground, and the mode of carrying wires now in use is objectionable, aerial cables, so arranged that they can be thrown to the ground in case of fire, might be found to admirably solve the problem. Anyway, why not adopt this method until a better one may be brought forward and its practicability demonstrated? Proceeding in this direction, it is not improbable that in due time a structure might be involved for conveying the cabled wires overhead, which would neither be an offense to the eye nor an obstruction to the fire department, and which would not, like an underground system, necessitate the frequent tearing up of the streets.

At all events, the action of the council in ordering the wires underground is premature and ill-advised. The substitute proposed by the Western Union Company is a reasonable one, in the present state of the science; and if the city persists in tearing down the cables the Western Union need only let them remain disconnected for a few days to raise a storm of public feeling that will compel their restoration

It is certainly plain now that the wires cannot be placed underground before the first of next May. It must be apparent to every thinking man, and should be plain even to a Chicago politician, that sufficient time was not given to the companies, and that to cut the wires would only be to isolate Chicago business men from the world at large. Two days of non-intercourse with the outside world, with New York telegraphing to St. Louis and Cincinnati by way of the boundary lines of Cook County, Illinois, would almost be provocative of a riot in Chicago. If wires have to be placed underground, time should be allowed in which to do the work; no enlightened city can afford to tolerate officials who suddenly send its people back to the Middle Ages by stopping telegraphic communication. This cannot be the Chicago of the enterprise of which we have heard so much.

THE seventeenth bulletin of the Edison Electric Light Company is an interesting and complete exhibit of the surprising growth of the electric light, and the rapid advance in public favor all over the world of the Edison light in particular. The arrangement of the plants in this country are given in detail, including a description of plants for village lighting and in a good many newspaper offices. It is stated that in the first district of this city the company is lighting 368 houses, wired for 8,117 lamps. It is also interesting to learn that the building of the Western Union Telegraph Company, Dey street and Broadway, is to be lighted from the Pearl street station by a special conductor running down John street, and connected with the net-work of conductors in the first district, at Nassau street. The building is being wired for 345 lamps, but for the present only about 255 will be used, distributed somewhat as follows: Associated Press rooms, 55 lamps; operating room 107; second floor 55; halls, 8; first floor, No. 8 Dey street, 15, and second floor, No. 8 Dey street, 15; total 255 lamps. In England the Edison plants installed or in process of installation by the London company number 4,463, and by the Manchester company 3,980—a total of 8,443 plants. The company is also lighting the Holborn Viaduct, the first instance in that city of a public thoroughfare being lighted by incandescent electric lights. On the continent of Europe the machine works of M. Labrador, at Madrid, Spain, are already lighted, and 1,000 lights are now being made to light the depot and Post-Office at Stuttgart, Germany; while at Dijon, France, the Edison Company is just establishing a central station. At Ivry-sur-Seine the Edison factory is employing 200 workmen, and the portion of the factory which is devoted to the manufacture of lamps is turning out 400 lamps a day, to say nothing of dynamos and other apparatus. During the recent court ball at Vienna the imperial palace was also illuminated by the Edison light. In Cuba the office of the *Diario de la Marina* (newspaper), in Havana, is lighted by the Edison system, as are also several sugar estates on that island, while in South America several mills and private houses are lighted from the central station at Santiago, Chili. There is also an interesting account of the engine "Lawrence," which in March last performed the unprecedented feat of running at a speed of 350 revolutions per minute for 17 days without stopping—a number of revolutions which in a locomotive would have been equal to a journey around the world. The last paragraph in the pamphlet serves to show to what perfection electric lighting machinery has been brought, while the entire bulletin demonstrates the popularity of the Edison incandescent light.

NOTWITHSTANDING many demonstrations in recent years of the futility of legislation designed to control telegraphic competition and prevent telegraphic monoply, efforts in this line continue to increase rather than diminish. The State Senate of Illinois is the latest legislative body to try its powers in this direction. It has struck a new lead, and has succeeded in producing a measure as absurd as any of its predecessors. The bill, which was passed on the 10th instant, by a vote of 42 to 7, and now goes to the House, provides that "no telegraph companies incorporated or doing business in the State shall have the power to contract with any owner of land, or with any railroad company, for the right to erect or maintain a telegraph line over his, her, or its lands, or over the right of way of any

such railroads, to the exclusion of the lines of other telegraph companies organized or doing business under the laws of the State; nor shall any such railroad company have power to make such contract with any such telegraph company; and every such contract shall be void and of no effect. The penalty shall be not less than $1,000 nor more than $5,000 for the first offense, and for the second offense not loss than $5,000 nor more than $10,000, and for the third offense not less than $10,000 nor more than $20,000, and for every subsequent offense and conviction thereon shall be liable to a fine of $25,000." No very great amount of executive or legal acumen will be required to circumvent so ill-conceived a piece of legislation as this.

AN interesting telegraphic event was the transmission from New York to several enterprising Western newspapers of the poem read by Dr. Oliver Wendell Holmes at the banquet given in his honor in this city on the 12th instant, although an incident of this kind is no longer a novelty, some of Tennyson's verses having achieved the distinction of being cabled across the Atlantic. Dr. Holmes' poem contained two hundred and thirty lines, in the heroic measure, or about two thousand words, and was received in Cincinnati in good shape, but a quotation from Shakespeare, introduced by Dr. Fordyce Barker in welcoming the guest of the evening, did not fare so well in its transit to Pittsburgh. The passage very appropriately employed by Dr. Barker is from the "Merchant of Venice," and it as follows:

"Sir, you are very welcome to our house;
This must appear in other ways than words,
Therefore I scant the breathing courtesy."

As received in Pittsburgh, and published in the *Dispatch* of that city, the last line read:

"Therefore I scent the breathing cookery."

After all, as the *Dispatch* philosophically remarks, the line as rendered by the telegraph has a very hospitable sound, and conveys a heartiness of welcome not exceeded by the original.

THOSE who have had the misfortune to live in the vicinity of an amateur violinist or a student of that instrument, and who have often wondered how life could be worth living to a teacher, subjected continually to the nerve-shattering scrapings, will appreciate the stroke of genius achieved by Professor Victor Fechter, a Cincinnati violinist, who has had placed in his residence a telephone with which he can dictate the tuning of his pupils' violins and give them instruction at a great distance. Many of them living at Glendale, Hamilton, Dayton and other suburban towns play their violins before their telephones when practicing, and by ringing the professor up, he can dictate to the pupils with his violin almost as plainly as if he were in the same house. Thus, day by day electricity is opening up new methods of alleviating the discomforts and increasing the value of life.

EX-PRESIDENT DIAZ, of Mexico, again visited the operating room in the Western Union Building last Wednesday, accompanied by General Eckert, and sent a m essage ex changing greetings with the agent of the Associated Press in London, for the purpose of seeing how quickly an answer may be received by cable. The message was sent at 3:32 P. M., and the answer was delivered to the president at 3:52 P. M., an interval of twenty minutes, which includes the time taken for the delivery of the message and answer between the Central Cable office and Associated Press office in London—at least ten minutes. A message was subsequently sent to the London office, asking for an item of Spanish or Mexican news, to which an answer was received in exactly seven minutes. General Eckert and President Diaz expressed themselves as highly pleased with the results.

A SUIT of considerable importance, especially to holders of American Bell Company's stock, has just been decided in Boston. Edward E. Pratt and others brought suit to restrain the American Bell Company from issuing certain stock. The complainant represented the holders of bonds issued in October, 1882, amounting to $645,000. The bonds were to be converted at par in April, 1884, for stock in the company, share for share, and the complainants allege that if the amount of stock is increased to nearly $10,000,000, as recently voted by the company, their security will be impaired and their rights encroached upon. On Saturday, April 14, Judge Holmes rendered a decision in favor of the defendant. It is said, however, that the case will be appealed to the full court, and its final decision will be one of great importance to corporations and the public.

WE have received a pamphlet entitled, "Some Serious Considerations Concerning a Governmental Telegraph," written in answer to an address on "Governmental Control of electric communication," delivered recently before the Scranton Board of Trade by Colonel J. A. Price. Though no name is attached to the reply beyond that of "The Author," it is so well written that the particular author need not have been ashamed to sign it. It is an effective reply to the arguments of those who have become fanatics upon the question of government telegraphs, though it was scarcely necessary to get up so conclusive a case against a professional wind-bag like "Col." J. A. Price.

THE discontent among the British telegraphers has once more attracted the attention of the Postmaster-General who, in a special notice, says: "The Postmaster-General observes that attempts are being made to press him to re-open and revise the question of the re-organization of the telegraph service, which, after the most attentive consideration, and at a great cost to the taxpayer, he settled in 1881. He thinks it right to inform the staff that he has no intention of re-opening the question involved in that settlement." But if we have rightly judged the spirit of our English cousins displayed hitherto, this sweeping refusal will not end the matter.

WHILE Edison was in Montreal he was told the gas company there sold gas for stoves at $1.20 per thousand, thus proving that they could afford to reduce the price very much. Edison said, "But that is not the same gas—that is not illuminating gas." "Yes, it is the very same gas, and is considered a very good quality." At this he expressed much surprise.

THE proposed Atlantic cable via Cuba to Spain will prove a safer speculation than some of the older and longer cables, and in cutting down the rates between Spain and Cuba from $1.20 to 30 cents a word, it will make a big cut into the Gould-Pender pool.

WHEN one standing on the shore of the Atlantic can speak through the telephone in the ear of a friend upon the golden strand of the Pacific, the familiar quotation may fitly be metamorphosed into "Distance lends enchantment to the voice."

IMMENSE quantities of telegraph and telephone poles have been teamed into the village of Dunkalk, Ont., and a special train leaves daily with these products for the various markets of the Provinces and the United States.

THE death of Mr. V. W. Bullock, removes from our ranks one of the oldest pioneers in telegraphy. He was the father of Hon. Rufus B. Bullock, ex-Governor of Georgia, and one of the best printing operators in the country.

LOST—An independent Atlantic cable. Any information concerning it will be thankfully received by Mr. James Gordon Bennett, New York, Mr. John W. Garrrett, Baltimore, or the general public.

A JURY in Kings County, N. B., has assessed the Dominion Telegraph Company $320 damages for cutting down shade and ornamental trees in front of Mr. Hatfield's house.

THE "Oberlin Telegraph Company" (college) has suddenly left Oberlin and set up shop at Ann Arbor, Mich. We congratulate the citizens of Oberlin.

THE "Great Eastern," which at one time was famous for laying cables, now continues to be a useless and unprofitable hulk.

A LONDON despatch says that Siemens, the well known telegraphic engineer, has been knighted.

Brush Electric Light Companies in Convention.

As announced in the March 17 issue of THE OPERATOR AND ELECTRICAL WORLD, an important meeting of representatives of the various Brush electric light companies in different parts of the country was held at Cincinnati on the 10th instant, pursuant to a circular issued a few weeks ago. In this circular, which was issued by the S. W. Brush Electric Light and Power Co. of New Orleans, it was stated that the Brush sub-companies having given or contracted to give nearly one-half of their capital stock to the home company, for the privilege of using the inventions of Mr. Brush, find that although possibly the purchase of franchise may some time in the future prove a profitable investment, they cannot safely increase the burden by complying with the demands of the Swan Company. which expected the sub-companies to pay a large cash bonus for the right to use the Swan lamp. We have no guarantee, the circular goes on, "that the Swan lamp will always be the most desirable offered for sale. Another year may reveal a lamp every way as satisfactory as the Swan, the manufacturers of which will be satisfied to sell at a profit of 100 or 150 per cent., without asking the customer, in addition, the enormous royalty for the privilege of buying. In the preface to the recent work on 'Electric Illumination,' by James Dredge, he remarks:

"'That some of the companies have a useful and profitable career before them is not open to question, but it is doubtful whether few, perhaps if any, of the patents thus sold are worth the money demanded and paid for them; in some cases because the invention has but small intrinsic value, in others because its originality, and therefore the validity of the patents protecting it, is open to question; and in all or nearly all cases, because with the rapid march of invention in this direction, toward which so many able minds are turned, progress is so constant and so quick, that whatever appears almost boundless in its ingenuity and usefulness to-day, is rendered obsolete by an invention of greater ingenuity and wider usefulness to-morrow.'

"If we purchase a franchise, and have no protection from future improvements, it may soon cease to have any value. Knowing these facts, several lighting companies have refused to consider the proposition of the Swan Company, and have so notified them. The Swan Company have no complete system—nothing but a lamp. If Brush companies act in concert, the Swan Company must make terms with us on a basis of fair profits on lamps, without any payment for privilege of buying the same. If the Swan Company will not make fair terms with us, we shall find other companies or inventors anxious to secure the large market which we constitute. We send this circular inviting you to appoint an authorized representative of your company, fully empowered by your Directors, to speak and act for you, to meet with us in the city of Cincinnati, April 10, 1883, for the purpose of deciding on some definite course to pursue, and so secure concert of action in this matter of common interest."

The following were among the delegates present, eighteen companies being represented: Alexander Swift and B. F. Orton, secretary, East Saginaw, Mich.; D. Howard Tuxworth and David E. Evans, Baltimore, Md.; W. J. Port, Toledo; E. M. Avery, Cleveland; George O'Connor, New Orleans; C. M. Bullock, Chicago; S. H. Bell, Nashville; J. L. Smyser, Louisville; C. W. Huskill, Memphis; S. A. Duncan and John E. Raidell, Pittsburgh; Superintendent Weisleder, Cincinnati, O.; Samuel Hipp, Galveston, Texas.

The proceedings were not made public, but we learn that Mr. T. J. Montgomery, of New York, was present to represent the Swan Company, and seemed disposed, if possible, to arrange the matter to the satisfaction to the sub-companies. Other incandescent lamps were discussed, and the claim of the Maxim and Edison companies that any incandescent lamp other than their own infringes their patents, were also briefly considered and voted not worth considering. The common report that the parent company held or was seeking the control of the Swan light was not discussed, as it has been shown that its holdings of Swan stock were trifling as compared with its interest in the success of the Brush companies, forty-eight per cent. of whose stock it holds and to whom it expects, besides, to sell large numbers of storage batteries, which it manufactures.

The upshot of the discussion was that an agreement perfectly satisfactory to all parties—as was evident by the smiling countenances of all concerned on adjournment at midnight—was arrived at. The Swan light was adopted on terms which are not to be made public, and a permanent organization of the Brush Lighting companies was effected with the following officers:

President—M. C. Bullock, of Chicago.
First Vice-President—S. H. Bell, of Nashville.
Second Vice-President—F. P. Baker, of Topeka.
Secretary—J. F. Raidell, of Pittsburgh.
Treasurer—Lewis Seasongood, Cincinnati.

An executive committee of five, consisting of the first four officers named and Mr. Geo. O'Connor, of New Orleans, was also elected.

Mr. G. W. Stockley, vice-president of the parent company, at Cleveland, and holder of one-fifth of its stock, was present, and assisted at what seems to have been a happy settlement of affairs. The adjournment was to meet at the call of the executive committee.

The Electric Light Abroad.

The *London Times* says: The electric light has been applied of late in various cases where the effect has been singularly picturesque. Thus, during a congress of Greek medical men at Athens last year, several electric lamps were placed at elevated points about the Acropolis, and the aspect of the ruins so lit up is said to have been very striking. The company of steam navigation on the Rhine and the Lake of Constance started last year a night service of steamers supplied with Burgin electric lamps, to illuminate the beautiful banks of the river. The steamer left Schaffhausen at fall of night and sailed to Biesingen, and the passengers were enabled to enjoy the scenery in those novel circumstances. Further, the falls of the Rhine have been illuminated at night by a powerful electric light placed on the right bank. To appreciate fully the remarkable appearance of the foaming torrent so lit up it is necessary to reach the principal rock, on which is a small pavilion, and where the stream divides into two large parts. Again, there is a regular night service instituted between Cannes and the Lerin Islands, the vessel being the steam-yacht "Cannois," which has a powerful Mangin lamp, also thirty-four Swan lamps, arranged between the masts and elsewhere. The electric light guides the course in the difficult navigation which often occurs in these trips, and furnishes many lovely views of scenery.

The "Portable Electric Light Company" Denied the Use of the Mails.

A dispatch from Washington says, that the Post-Office Department has ordered that the Portable Electric Light Company, of No. 22 Water street, Boston, advertised extensively throughout the country, be placed on the "fraud list," and that all money-orders and registered letters addressed to them be returned to the senders. This action of the Department is the outcome of letters from Charles B. Barrett, Post-office Inspector at Philadelphia, who reports the following facts:

Dales, a clerk in the Philadelphia post-office, saw the advertisement of the portable electric light on the cover of the Postal Guide. He ordered a machine and paid $4 for it. He expected to get an illuminator, but received only a lighter for cigars, etc. Mr. Barrett was notified by the department to examine the machine in question, in order that he might be able to advise the department whether the machine is "substantially what it is represented to be."

To this inquiry he replied that he had examined the

advertisements and circulars of the company and from their wording he concluded that any one would be led to believe that the machine advertised was an illuminator, and even though the company be given the benefit of every doubt, and it should be allowed that the reader would construe the advertisement to refer to an electric "lighter," there is an apparent scheme to defraud; for from the testimony of the different purchasers they are worthless even as lighters. The letter cites the fact that a Mr. Heiss, of Philadelphia, believing them to be illuminators, purchased a supply, for which he paid the company $75; that he soon discovered them to be of no value, and he could not offer them for sale. The Portable Electric Light Company decline, however, to either return him his money or take back the machines. Upon this evidence the department has acted as above stated.

Electric Service in Every Day Life.

There is probably no other building, except perhaps the Grand Opera-House in Paris, in which the possibilities of electric service in every day life are shown so completely as in the National Museum at Washington. The building covers a large area, and easy and rapid communications between those who work in it is a matter of importance. First should be mentioned a system of telephones and call-bells, by which those in any room communicate with every other room. Twenty-six telephones in the building are connected by a telephone exchange in a room near the main entrance, and this local exchange is connected with the main telephone office of the city, so that each employé can talk with every other employé and also with every telephone subscriber in the city. Owing to this telephone service only three messengers are used. Electricity supplies the light which is used in the photographic laboratory, so that the work does not depend upon a fickle sun. If one of the 850 windows or one of the 230 doors is opened, a bell rings and an electric annunciator shows to the attendant in the main office just which window or door has been touched. This system is to be extended to each of the many cases in which specimens are exhibited, so that the attendant in the main office will know when one of these is disturbed. The watchmen on duty in the night are governed by electricity. There are stations which each watchman must visit every hour, and he must by a slight motion release an electric current which pierces a paper dial and records the hour and minute of his visit. The time of day is shown by the action of an electric current upon the hour and minute hands of sixteen clock-dials distributed through the building. The parts of the museum open to the public are illuminated by electric light. The currents used in the building are conveyed by 65,000 feet of wires.—*New York Times.*

Dr. Holmes' Poem by Telegraph.

The telegraphing of so long a poem as that of Dr. Oliver Wendell Holmes was no ordinary feat, and would not have been thought of a dozen years ago. The poem consists of 230 lines, heroic measure, in 2,300 syllables. In re-reading it we can find but a single apparent mistake. In speaking of "the straight-back measure with its stately stride," in which Pope and Dryden sang, the poet says "Byron and Campbell wore its clanking chain;" "wore" was misprinted "were."—*Cincinnati Commercial Gazette.*

The proficiency of the telegraph and its operators is well illustrated in the above case. The error "were" instead of "wore" can probably be credited to the typo rather than to the operator. It was a fine piece of work, and reflects credit upon all concerned.

Chicago Notes and Personals.

To the Editor of The Operator and Electrical World:

SIR: The Western Union Company has at last taken a step in the right direction by putting in three ventilators about three feet wide by eight in length, in the roof of the main operating room. These also let in enough light to cut down the gas bill considerably. The gentlemen's wash-room has also been moved into the battery room, thereby enlarging the operating room. It would be well if the good work should be continued by enlarging the lunch room and fitting up a coat room that would afford some security.

The Postal Telegraph Co.'s general office is on the third floor of the Merchants' Building. Mr. Geo. Hoyt has left the Western Union and is with the Postal. Among the recent arrivals are Mr. A. C. Brady from Pittsburg, and Mr. James Coulter of Oil City, both of whom are with the B. & O. It is impossible to keep track of the changes in the Western Union; they come and go incessantly.

The Mutual Union operators have been employing their leisure moments in getting out a spicy little paper, called The *Pick-Ax*, of which Mr. Charles A. Colby is editor and manager, and Mr. R. D. Blumenfeld fighting editor. Mr. Blumenfeld has charge of the art department. Some of the caricatures are very neatly sketched, and do the gentleman credit.

The *Daily News* publishes an article to the effect that the telegraphers had organized a very strong base-ball nine for the season, consisting of thirteen of the best amateurs in the city, with Mr. E. A. Quick as president, Mr. Geo. S. Geiger as secretary, and Mr. Edward G. Boole treasurer. They expect to play in Cleveland, Louisville, Indianapolis, St. Louis, and other places. The only foundation for this statement, so far as can be learned, is that considerable talking has been done looking to the formation of a good nine. Chicago has some very fine amateurs among the telegraphers, and if they practice there they can carry the "telegraph pennant" as easily as the White Stockings do the league championship.

THE ELECTRIC LIGHT.

STORAGE OF ELECTRICITY.—Charles Bingham Penrose, A. B., graduate student in physics at Harvard, has been awarded the Bowdoin prize of $100 for a dissertation on the "Storage of Electric Energy."

IS THIS CORRECT?—Col. Mapleson, speaking of a singer engaged by a rival manager, says: "O, he's no singer. His voice is one constant tremolo. It shakes like an electric light. Don't forget that—like an electric light."

A NEW COMPANY.—A charter has been issued to the McTighe Electric Light Manufacturing Company, of Pittsburgh, Pa. The capital stock is fixed at $300,000. The company will now enter upon the manufacture of machines, erecting a large factory in Pittsburgh for the purpose.

THE LIGHT IN SURGERY.—At a recent meeting of the Leeds and West Riding Medico-Chirurgical Society Mr. Margeton, of Dewsberry, England, exhibited an incadescent electric lamp, designed by himself, and used by him since October last in examining the mouth and throat. The globe was about half the size of a walnut. It can be held in the mouth for two minutes without discomfort from heat.

THE BRUSH COMPANY'S WORKS.—The works of the Cleveland Electric Company, including their new addition, which is now almost completed, cover 6 acres of ground. A draft stack which the company has recently put up is capable of making a draft for engines and boilers aggregating 1,500 horse-power. Some time during the present month the company will begin to place the new Brush storage or secondary battery on the market.

ENGINES FOR ELECTRIC LIGHTING.—An order has been received by Messrs. E. P. Allis & Co., of the Reliance Works, Milwaukee, from Mandel Bros., of Chicago, for a 16x42 Reynolds-Corliss engine complete, to drive an electric-light plant and pneumatic cash-tubes in their large dry goods establishment. The same firm also recently received an order from the Louisville Electric Light Co., of Louisville, Ky., for a 20x42 engine of the Reynolds-Corliss type, with boilers, heater, pump, etc., to drive an electric light plant.

THE ELECTRIC LIGHT IN ENGLAND.—An English newspaper of authority on all matters connected with scientific subjects says: "Electric lighting is at present under a cloud. The shares have run down to a very low figure in the market. Paid-up shares in Edison, Brush, or Pilsen stock going at half-a-crown each is a sign of the indisposition of the public to buy them. There is no demand for electric light shares at the present time. Whatever their actual or possible value, people will not buy them; neither will they subscribe money to float a new company. Six months ago the very name of electricity was a word to conjure with."

THE EFFECT OF THE ELECTRIC LIGHT ON PLANTS.—M. P. P. Déhéraim, who has been following up Dr. Siemens' experiments on the electric light and vegetation, summarizes the results of experiments on plants at the Electrical Exhibition at the Palais d'Industrie in 1881 thus: (1) The electric arc light emits radiations which are injurious to vegetation. (2) Most of these radiations are arrested by colorless glass. (3) The electric light emits radiations powerful enough to maintain plants in vegetation for two months and a half. (4) The beneficial radiations are not sufficiently powerful to cause the growth of germinating seeds or to allow of the maturation of fruit in older plants. —*Electrical Review.*

CLEVELAND.—A correspondent in Cleveland writes: The first Edison plant in this city has been in operation in the Wilshire block for about two weeks. Nearly every one who has been to see it was disappointed in it, as the color is the same as gas and the brilliancy no greater, if as great. I notice considerable flickering also. The Brush Company has its office illuminated by 25 Swan lamps run by the Brush storage system, which seems a success, as the light is perfectly steady and a clear brilliant white. The Brush-Swan Company is wiring quite a number of the finest residences and business blocks in the city, and will be able to furnish the storage batteries in any quantity by May 1. I understand the light will be furnished at a little less than gas (gas is $1.50 per M here), which will doubtless create an extensive demand for the apparatus.

THE ELECTRIC LIGHT IN NEW YORK CITY.—The *Times*, of this city, speaking of the recent opening of bids for lighting the city, says: "One of the beneficent advantages which the invention of the electric lamp was to confer upon our overtaxed fellow-citizens was a cheap system of lighting of streets and public places. The gas companies were to be thrown completely into the shade, as it were, by the inexpensive and low-priced brilliancy of the electric lamp. In the so-called competition the Brush Electric Illuminating Company ask 70 cents for each lamp per night for a certain territory; the United States Illuminating Company, curiously enough, will light another portion of the City for the same price, and the first named corporation will light the extreme northern portion of the City, where there is no competition, for $1 per lamp each night. The moral of all this is that the gas companies do not compete with each other, and the electric light does not compete with anything."

THE IMPROVEMENT OF DYNAMOS.—In the Hopkinson-Muirhead and Thomson-Ferranti dynamo-electro machines the loop form of coil is adopted with good effect, and the advantage gained is usually attributed to the diminished non-effective resistance of the coil. But this form of coil was, we understand, adopted originally by Dr. Muirhead not only for the reduced non-effective resistance which it offered, but for the diminished self-induction in the coil. In an open coil of this kind self-induction is less than in a closed coil. The self-induction in dynamos is a factor which has been overlooked in their construction, and must operate considerably in reducing their efficiency. No dynamo as now made has the theoretical efficiency it ought to have, even allowing for waste by heating in the coils and Foucault effect. The reason, or at least one reason, for this is, as Dr. Muirhead has observed, probably due to the self-induction in the coils. Actual measurement of this quantity shows that in the Hopkinson-Muirhead loops it is less than in closed bobbins. Inventors will do well to turn their attention to this subject, with a view to diminishing the self-induction in dynamos.—*Engineering.*

FRUIT RIPENING BY ELECTRIC LIGHT.—The London *Gardener's Magazine* says: The employment of the electric light in plant growing may be said to progress steadily, because the possibility of quickening production by this means has been demonstrated, and several kinds of fruit have been brought to apparent perfection under the direction of Dr. Siemens. But hitherto "apparent perfection" is the only point attained; the perfection demanded by the palate is still wanting, and there appears no prospect whatever of its attainment. The strawberries grown last year were pretty, but worthless. The melons Mr. Buchanan, gardener to Dr. Siemens, has ripened lately and presented to the notice of the Scientific Committee of the R. H. S., are of such poor quality that to render them eatable they would need to be strongly flavored with condiments, as the things called melons were in the time of Queen Elizabeth. But the fact remains that the electric light is in some degree suitable to supplement the light of the sun in plant growing, and there may arise opportunities for its useful and profitable application, for there are many things besides strawberries and melons the world is in want of, and will gladly accept when the gardener can produce them.

GEN. DIAZ INSPECTING THE EDISON SYSTEM.—On the evening of April 16th, ex-President Diaz, of Mexico, with his wife and the members of his suite, were initiated to a limited extent into the mysteries of Edison's system of electric lighting. The party was conducted on its tour of observation by Thomas A. Edison and his wife, Mr. N. F. Hastings, Secretary of the company, and Col. Sherman, who represents the company in South America. The first place visited was the house of Engine No. 32, in John street, which is fitted with the Edison light. The house is one of the model engine-houses of the city, and the record of its company is shown by a handsome library presented to the members by Goodwin & Co., for bravery shown in entering a building stored with powder and other explosives, at No. 206 Front street, July 12, 1880, and extinguishing a fire. There are the usual automatic appliances, and in addition Mr. Edison has contrived an arrangement working in unison with them by which the electric lights are turned on the instant the alarm bell rings. When the visitors arrived Capt. Joseph F. McGill had the lights extinguished and his men were sent to the bunk-room on the second story. The quiet that pervaded the house was broken by the sounding of the alarm. Lights were turned up, firemen came from their bunks on the sliding poles, and in four seconds, according to time taken by Gen. Diaz and his party, the horses were harnessed, the men in their seats and everything ready for the trip to a fire. The experiment was repeated a half-dozen times, and each time was greeted with applause, in which Mrs. Diaz led. Gen. Diaz also joined in the cheering which greeted the performances, and expressed himself as very much gratified, saying the performance surpassed those he had witnessed in Boston. After leaving the engine-house the party visited the First District works, in Pearl street, and then the machine shops in Goerck street, and Mr. Edison's laboratory, at Seventeenth street and Avenue B. Elaborate explanations were made by Col. Sherman, who is an old friend of Gen. Diaz, which were listened to with much apparent interest by the members of the party.

TELEPHONE DEPARTMENT.

MEXICO.—Mr. Geo. W. La Rue, who came from Mexico recently on business connected with the Mexican Telephone Company, returned April 12 on the City of Washington. Mr. Delano, president of the same company went with him for a few weeks.

A SENSIBLE VIEW OF IT.—The House Revenue Committee, of Illinois, looking upon the telephone business as a young but growing industry which ought to be encouraged, decided to report adversely on the bill taxing the telephone companies a percentage of their gross receipts.

LONG-DISTANCE TELEPHONY IN ENGLAND.—Long-distance talking by telephone has been successfully conducted by means of the ordinary telegraph wire of the Great Northern Railway in England between London and Peterboro; but they haven't the room in that country to have stations as wide apart as in this.

A GOOD SHOWING.—The various telephone companies under Lowell management handled in March 22,618 exterritorial messages, as follows: Maine, 1,765; Boston and Northern, 12,574, an increase of 1,757 messages; Bay State, 8,279, an increase of 1,367 messages. This is the largest months' business ever transacted.

THE GRAMMAR OF THE TELEPHONE.—The word "that," asserts a grammarian, is the only one in the language that can be used five times successively within absolute correctness of grammatical construction. This discovery must have been made before the telephone was invented and the word "hello" used in connection therewith.—*N. Y. Com. Adv.*

MEXICO.—Scene—"Gringo" manager of telephone in an office in a northern Mexican city. Enter Señor Mexicano, who wishes to talk with a Mexican merchant in a distant city. He inquires of the manager if there is an American there to talk with. "No, there is not," says the manager, "but you may talk with the merchant himself." Señor Mexicano: "Ah! will it talk Spanish also?"—*Railway Age.*

ANOTHER QUEER COMPANY.—The Secretary of State of Illinois has issued an incorporation license to the Acousto-Electric Telephone Company, of Chicago. The capital is $2,000,000, and the incorporators are S. W. Fallis, D. A. Strong and John B. Strong. The purpose of the corporation, it is announced, is to develop and put into practical use the transmission of the human voice in unison with the undeviating law of polarity, whatever that may be.

HACKMEN AND THE TELEPHONE.—Cleveland hackmen have a grievance in the telephone. Said one driver: "With each new wire that enters that building which you see there (pointing to the telephone exchange in Superior street) just so much has our business decreased, and that web of wires which you see above us is like a black cloud hanging over our heads, which seems to us to be no good omen, but rather causes us to think that ere long we will be obliged, like the Chinese, to go," and he cast a sullen look in the direction of the exchange.

IMPROVEMENT IN WASHINGTON.—The telephone company in Washington has begun the use of cables instead of separate wires. Each year the rapidly growing shade-trees have made it necessary to increase the height of poles, in order to carry the wires clear of the trees. The limit of relief in this direction having been reached, the company has begun to introduce a cable containing fifty insulated wires. This can be strung on ordinary poles, and carried through trees without injury to the latter or disturbance of the circuit. It will also enable the com-

pany to dispense with a great network of wires through many of the private streets.

ANOTHER TELEPHONE.—*Knowledge* describes the receiver of a new telephone, which is based upon the principle that when an iron wire or rod is magnetized it suffers a slight increase in length with a compensating decrease in cross-section. The inventor claims "the construction of a telephonic receiving instrument consisting of a magnetic wire attached to a sonorous disc or plate, and wound with a primary coil connected to a local battery, and with a secondary coil connected to the telephone line wire, as described." *Knowledge* anticipates very satisfactory results from the new instrument, which even in its crude form, it says, reprcduces sounds with remarkable clearness.

MORE DISCRIMINATION.—A suit has been brought by the B. & O. Telegraph Company against the Midland Telephone Company, of Ohio, praying for a writ of mandamus ordering the telephone company to connect its exchanges with the offices of the B. & O. Company. The petition of plaintiff states that the defendant has telephone exchanges in the cities of Columbus, Zanesville, Newark, Mt. Vernon, Mansfield, Sandusky, Tiffin and Defiance, and has refused to connect the B. & O. offices with the central exchanges, setting forth as a reason that it had made a contract with the Western Union Company by which no other telegraph company should use the wires of the Midland. Plaintiff claims that this is an unjust discrimination.

THE LOWELL COMPANIES.—The telephone companies under Lowell management increased their subscribers in March as follows:

Companies.	Gain.	Total April 1.
National Bell, of Maine	88	3,827
Boston and Northern	95	3,034
Bay State	119	2,525
Suburban	100	1,200
Union	25	285
Granite State	5	419
Northwestern (official count—does not include complete list)	13	1,268
Total	445	12,558

A TELEPHONE STORY FOR THE MARINES.—The following story, told by a local paper, illustrates the universality of the telephone as a means of communication: A gentleman in Danielsonville, Conn., whose favorite dog enjoys following his carriage, by accident left this animal some miles from home. The people, recognizing the dog, shut him in the house over night. The next morning a voice asked through the telephone: "Have you lost a dog?" "Yes; where is he?" Voice: "Call him!" He did so. The telephone was put near the dog, when he recognized his master's voice, and in his dog way manifested joy, licking the instrument, and jumping about, eager to answer the call.

THE TELEPHONE IN LONDON.—The *Electrician* of March 31st says: In an annual article we give some statistics showing the progress made by the United Telephone Company during last year. At the time we wrote the total number of subscribers to the company's exchange was 2,247. On the 27th of January it had risen to 2,442, on the 28th of February to 2,541, and on the 28th of March, that is Wednesday last, the total number was 2,606. The number of calls per day in July last averaged 14,000. If this figure be compared with the following it will be seen that considerable progress has been made. Thus, on the 14th of March this year the number of calls was 18,879; on the 15th, 18,910; on the 16th, 19,948 (the 17th, being a Saturday, cannot be compared with ordinary days), on the 19th, 19,654; on the 20th, 19,958; on the 21st, 19,948; and on the 22d, 20,715. For these figures we are indebted to the courtesy of the company.

LONG DISTANCE TELEPHONY.—Referring to the subject of long-range telephony, Mr. George H. Bliss, the inventor of the Bliss individual bell, and a well-known electrician, has claimed for some time that the instruments now in use are all right and perfectly adapted for the transmission of sound long distances, but in his opinion the conductors—the *wire*—should be improved. Experiments made under Mr. Bliss' patent of June 13, 1882, have been as wonderful as with any other instruments. Conversation between Boston and Providence (60 miles as the wires run) is fully as clear and distinct as over short circuits in either city. Mr. Lockwood, the electrician of the Bell Telephone Company, standing several feet in front of a transmitter in Boston, whispered to Mr. Bliss, at Providence, and the whisper was perfectly audible and understood, the sound being quite as loud through the phone as to persons standing in the room with the whisperer, thus showing no perceptible loss of sound in the 60 miles of transmission.

THE FUTURE OUTLOOK.—The financial writer on one of the leading Boston papers, in a private letter, gives his opinion of the telephone business and of the future of companies working under the Bell patent in the following encouraging strain:

"My opinion of the Bell Telephone Company of this city, or any other established company, is that the mere occupation of the field is in itself of such vast importance and so great advantage that the litigation in regard to patents sinks into insignificance. What chance is there to start an opposition company when the field is already occupied? If a new and more efficient instrument should be devised, what would be done with it? It seems to me that anything like competition is out of the question. There is no adequate inducement for a subscriber among hundreds of thousands with whom he can be put in communication, to leave a company until the new one is in a condition to offer equal facilities. In other words, a new company, to make headway, would practically have to gain all the subscribers to the old one, which would be unquestionably impossible."

The Boston *Transcript* thinks that for 1883 the net revenue of the American Bell Telephone Co. will be 25 per cent. on its capital stock. It adds that no one can estimate the future value of the Bell patent. It is, adds the *Transcript*, the most valuable franchise ever secured to any corporation, and if not interfered with by the courts or by the legislatures, may pay an income, in time, upon a capitalization of one hundred millions. The *Transcript* adds: When, some time ago, we wrote that the telephone interests of this country would surpass in value the telegraph interests, we were not aware how quickly this would be the case. Despite the fact that the Western Union Telegraph Company has a share capital of $80,000,000, double the capital of the same company some time after the telephone was invented, this eighty millions of pcaital, at its market price of 84 to-day, does not equal in value the market price of the Bell Telephone capital, combined with the market value of the sub-companies working under its patents. That the commercial value of the telephone, five years after its introduction to the public service, should be greater than the value of the telegraphic system of this country after twenty-five years of operation, no one would have dared to predict until very recently.

THE INFANCY OF THE EXCHANGE SYSTEM.—It is claimed that the first telephone exchange was opened at New Haven, Conn. The telephone had been experimented with before the students in Yale College, but it could not be made to work. A few days afterward, however, an exhibition was given in the Opera-House. This was a big success and the Bell Company was at once organized. At first the exchange had 8 wires, which ran to the houses of friends over the city. No one thought of using the telephone then for business. Instead of the bells now employed for calling, electric buttons were used, like those for calling servants at the hotels. The success created great excitement in New Haven, and more wires had soon to be built; afterward the exchange put up a switch-board of one hundred wires. Up to this time the telephone had been used entirely for social chatting and for the curiosity of the thing. Then the business men saw the advantages of the invention, and subscribers came in faster than wires could be put up. The exchange system soon spread to other cities, first to Boston, then Lowell, Albany, Troy, and next to Chicago. After this exchanges sprung up so rapidly all over the country that it was impossible to keep track of them. And from that time on the new business was a success.

THE TELEPHONE IN BROOKLYN.—In no place, probably, has the use of the telephone become more general than in Brooklyn. The business is now under the control of the Long Island Telephone Company, which has done as much during the past six or eight months as it did during all the previous periods of its existence. The large and rapid increase of wires on our principal thoroughfares has marked the progress made in the extension of the service. "We have doubled our subscription list since last July," said General Superintendent W. D. Sargent. "We then had 800 subscribers; we now have 1,600. We have extended our lines to Flushing, College Point, Whitestone and Bayside. We are building lines to Jamaica, Far Rockaway, Hempstead, Babylon and Patchogue, and we expect ultimately, probably during the summer season, to reach to the other end of the island. We have opened a pay station at Coney Island, and will have stations in all the leading hotels on the beach. In the city we have rebuilt lines with first class poles, and in the past six months have added between 500 and 600 miles of wire. About 5,000 messages pass over the wires daily in this city, and between Brooklyn and New York the number is some 30,000 a month. We have established a connection with Fire Department Headquarters, so that an alarm of fire in the house or business place of any of our subscribers can be sent at once to headquarters. A great change has taken place since the latter part of 1881, when the company had only 101 instruments in use."—*Brooklyn (N. Y.) Eagle.*

THE GOVERNMENT'S USE OF THE TELEPHONE.—A dispatch from Washington says that the government is engaged in a controversy with the Bell Telephone Company. Many telephones are used in the public service, especially by the Signal Corps. Since the war much attention has been paid to the improvement of means of communication between different parts of an army in the field and on the march, and a field telephone has been invented by Sergeant Eccard of the Signal Corps. The same man has improved the instruments employed at the seacoast stations, by which communication is maintained between the men of the life saving and signal services. The former are thus enabled to send word for aid to distant ports in cases of serious disasters on the coast. Eccard's combination of his own receiver with the Gray, Phelps and Edison transmitter is asserted by Government officers to be so much better than the Bell telephone that it is necessary for the proper conduct of the public business. The Eccard instruments are made with a view to heavier work than the Bell telephones are usually put to. Moreover, the officers of the Signal Corps think that the Government ought to be in position to avail itself of the inventions of the French and Germans, some of which are very valuable for military purposes. The question involves the right of the Government to use any invention that may be deemed for the best interests of the public service, for the Bell Company insists not only on charging a rental for each telephone used by the Government, but that all telephones other than those covered by Prof. Bell's patent shall be destroyed or surrendered. The Bell people say that the Government shall not use or manufacture any telephones that are not made under their patents. As soon as possible the question will be submitted for the opinion of the Attorney General.

OBSTACLES IN THE WAY OF LONG-RANGE TELEPHONING.—Speaking of long-distance telephoning, even were all other difficulties overcome, Mr. Henry Bentley, President of the Philadelphia Local Telegraph Co., says that we may accept it as a fact that no system of telephony which extends beyond a radius of 20 or 30 miles from any city, however large, will prove a paying investment. As an illustration, he says, we have a wire stretched as far as Trenton, but no further. Why? Because people living on the other side of Trenton have no use for Philadelphia, and don't care to telephone us. The next important point beyond Trenton is New Brunswick, and all its telephone business is transacted with New York. So with Wilmington, up to that point our wire extends and pays, but beyond that Baltimore steps in and secures what little business there may be. Another reason, and a valid one, why this lengthened system of telephonic communication would not be feasible is, its utter inadaptibility to commercial purposes. All transactions in the world of commerce or finance have to be recorded. There must be a record of everything. The telegraph provides for this, the telephone does not. Mr. A. will not sell ten car loads of corn on the strength of mere sound, or Mr. B. 10,000 bushels of wheat on a simple telephonic order. They would be foolish to do so, because there would be no record of such sale and consequently no responsibility. The telephone represents honor, but that is all; it is not a commercial record. The telegraph, on the other hand, is essential to commerce, and depends for its success—pecuniary, of course—upon the three great mainstays of finance, commerce and manufactures. Outside of these it would not pay. The use of the telegraph for mere social or domestic purposes would not defray wire maintenance and service, to say nothing of profits or dividends. And so with the telephone; it, like the telegraph, is sustained by these three props, and even they are of no paying value whatever when extended beyond a radius of 20 or 30 miles from any one city.

DASHES HERE AND THERE.

AMERICAN RAPID MEETING.—The stockholders of the American Rapid Telegraph Company, at a meeting held in Baltimore, on the 14th inst., re-elected the old board, with F. H. May, of New York, president.

A GIGANTIC ENTERPRISE.—The new factory of the Western Electric Co., at Chicago, will be 50x250 feet in dimensions, with wing 10x58, four stories in height, and will represent an expenditure of $100,000.

REDUCTION.—A telegram from Valparaiso, Chili, says that the reduction of rates to Buenos Ayres and the Argentine Republic via Galveston, announced April 18th by the Central and South American Telegraph Company, was received with much satisfaction by the commercial community.

CLOSING A MUTUAL UNION OFFICE.—The Mutual Union Telegraph office at Washington, Pa., one of the company's principal testing and repeating offices, will be closed in a week or ten days and the wires cut into the Western Union office. It is probable the batteries, repeaters, etc., will be shipped to the Western Union office in Pittsburgh.

WIRES IN CHICAGO.—In obedience to the order of the Mayor, the telegraph companies in Chicago have been gathering their wires into cables carried on short poles, and so arranged that they can be thrown to the ground in case of fire. On the 16th inst. the Council passed an order directing the Mayor to cause these cables to be removed at once.

SUBMARINE CABLE MAPS.—The Dominion government is about issuing a series of maps showing the submarine cables of the world. They have been prepared under the supervision of the celebrated electrician and one of the fathers of submarine cables, Mr. Frederic Newton Gisborne. They are in five sheets, three by four feet each, each map complete in itself.

AN ARSENAL STRUCK BY LIGHTNING.—A telegram from Vienna, dated March 23, says that "on the 10th inst. the arsenal of Cettinje was struck by lightning. The building is of very primitive construction, and contained considerable stores of gunpowder and ammunition. The central portion was blown up. Some brave men, however, at the risk of instantaneous destruction, threw out the chests of powder and ammunition into the snow, whence the men and women who had collected carried them to a safe distance."

REGISTERING VISITORS BY ELECTRICITY.—The Commissioners of the Cincinnati Exposition Society have decided to adopt a new style of register, to be worked by electricity. Instead of each of the nine registers recording separately, they are all to be connected with a dial in the office of the board. Each register is to be numbered, and each is to have five dials, on the same plan as a gas meter, so that each will record entrances up to 99,999. The work will require about three thousand feet of wire and a number of batteries. C. E. Jones & Bro. are to put in the work for $450.

THE TELEGRAPH IN CHINA.—The telegraph is working its way into China in the face of no inconsiderable difficulty. Permission was recently given for the construction of a line from Shanghai to Tientsin, and thence to Pekin, but, as the Chinese language, unfortunately, has no alphabet, the officials were in a fix. Now, however, it has been arranged that messages shall be translated into English or French, and transmitted to their destination in that shape. On arrival they are to be minutely examined by certain officials, who, with the true red-tape instinct, must be satisfied that the messages contain nothing dangerous to the State.

LIABILITY ON NIGHT MESSAGES.—Thomas S. Marr, of Nashville, Tenn., sent a half-rate message by the Western Union line to his New York broker, authorizing him to buy 1,000 shares of Memphis & Charleston stock. When the message was received in New York it read 100 shares, which the broker bought. The stock went up, and Marr entered suit against the company for $1,000 damages, claiming to have sustained this loss by the rising price of 900 shares, which his broker failed to purchase. Judge Reid, of the Circuit Court of Nashville, on April 9, held that the stipulations in the caption of the message blanks were reasonable and binding upon the sender of the messages, and that he could recover damages only to the amount stipulated—that is, ten times the cost of the message. This was $3, and judgment was so rendered.

STOCK QUOTATIONS.—Telegraph, telephone and electric light stock were quoted on Wednesday of last week and Wednesday of this week as follows:

	April 11.	April 18.
Western Union Telegraph	83¾	83⅛
Mutual Union Telegraph	19¼	20
American Cable	67¾	66¾
American District Telegraph	31	33
Edison Illuminating Co.	50	55
Underground Electric Cable	....	55
U. S. Electric Light	131	....
Shaw Telephone	25	....
Mexican Telephone	4	3¾
Tropical Telephone	2⅛	2¼
American Bell Telephone	228¼	225
Northern Telephone	....	145
Bay State Telephone	122	....

A CONDUIT COMPANY FOR CLEVELAND.—Messrs. C. A. Otis, H. M. Claflen, Henry W. S. Wood, George W. Wadsworth and E. S. Flint have applied by petition for permission to operate in the public streets of Cleveland for the period of fifty years an underground system of telegraph wires, or, as they put it, "a line of conduits or conductors, with the necessary wires, for the purpose of transmitting and furnishing electricity, power, light and sound." An ordinance granting the permission reached its second reading. It here provides that the projectors of the scheme shall give to the Board of Improvements a bond of $50,000 to hold the city free from damage by tearing up and leaving the streets in bad condition, or any other possible wrongful act of the company. A new scheme, known as the Dorsett pipe, for carrying underground telegraph wires, was exhibited at the City Hall, Cleveland, last week. Asphalt is used for insulation.

DAMAGE BY STORMS.—Since the great wind and sleet-storm in February, the Western Union Telegraph Com-

pany has rebuilt some 800 miles of wires along railroads in Indiana and Illinois, and Superintendent Wallack reports the lines again in good shape. However, there are yet thousands of new poles to be put in place of damaged poles, to which wires have been strung temporarily. On last Saturday morning the Northwest was again visited by a violent storm, which seemed to be general from North Platte, Neb., to Chicago, being the most severe in Iowa, where the damage to telegraph poles and wires caused an entire stoppage of business between Chicago, not even the press report going through. The linemen report that the rain in Iowa was so heavy that in many instances poles were washed out as clean as though they had been dug up, and those that did not topple over with their own weight were prostrated by the wind.

UNDERGROUND WIRES IN NEW YORK.—Work will be at once commenced by the Electric Lines Company in laying cables under the streets, by virtue of the franchise granted by the Board of Alderman over the Mayor's veto, and the officers say that it will be carried on at the rate of a block a day. Instead of using an iron pipe to contain electric wires, a wooden box nineteen inches wide and seven inches high, divided into three compartments, is employed. Each compartment will contain one cable of sixty-eight wires. The wires are strung upon gutta percha templets, which hold them apart, and when all are in place, the templets are so moved that the wires are twisted in opposite directions instead of remaining parallel—a device by which induction will be lessened. Then a mold is placed around the cable of naked wires and filled with a melted insulating material, of which paraffine is the chief ingredient. When the mixture cools and hardens the molds are removed, and the cable laid in its box in lengths of 400 feet.

DON'T WANT ANY TELEGRAPH POLES IN FRONT OF HIS HOUSE.—At Columbus, Ohio, on the 8th inst., while a gang of men were engaged in putting up telegraph poles for the Western Union Company on West State street, in front of a house belonging to William Wall, county commissioner, that gentleman appeared at a window and commenced throwing lumps of coal at them. J. R. Sloan, foreman, and a lineman were struck, the former twice, but were not injured. One of the men endeavored to pelt Wall with rocks, but failed. The chief of Police appeared on the scene and made Mr. Wall desist, but in a short time he resumed hostilities, when a policeman ordered the men to quit work, on the ground that they were violating the law relative to performing labor on Sunday, and so the war ended for the time being. A later dispatch says that a temporary injunction has been served on the telegraph company returnable April 23, and the case is set for hear ing May 12.

ELECTRICITY ON RAILWAYS.—A down east inventor has produced a safety scheme for railroad drawbridges. It is worked partly by electricity. A mile and a half from the bridge, on either side of it, there are attached to the side of the rails little buttons, which each train operates in passing. When these buttons are pressed, they set to ringing a bell in each of the draw tenders' shanties on the bridge, and thus give warning of the approach of the train. Not only this, but they "lock" the draw, so that it could not be swung off if the operator tried. Eight hundred feet from the draw is the switch of the siding, which terminates in a bed of sand. Before the draw is opened the switch must be opened, so that if the danger signal is not properly displayed, the safety switch must turn the train out of the path of danger. The ploughing of an engine through a bed of sand or soft dirt might unpleasantly jar passengers, but would cause, it is claimed, no serious results.

THE RAILWAY EXPOSITION.—The Westinghouse Steam Engine Company, Pittsburgh, Pa., and New York City, together with the Westinghouse Air-Brake Company and the Union Switch & Signal Company (all owned virtually by the same parties), will have the largest space at the Chicago Railway Exposition, It will be fully one-half larger than the whole machinery hall of the American Institute Fair. A line of engines will be shown from 14-inch diameter of cylinder down to 4-inch diameter, varying by one inch. The exhibit will include the first Westinghouse engine ever built, 3×2 inch. They will also light a portion of the building by a 7×5 inch engine driving a Brush dynamo 800 revolutions per minute. Another exhibit of interest to electricians will be the Waldumer electric brake. This brake is now in use on a train running into Ft. Wayne, and is reported as giving entire satisfaction.

THE BOSTON MESSENGERS' STRIKE.—A correspondent signing himself "A W. U. T. Co. Messenger Boy" writes to the Boston *Herald* as follows: "The boys at the Western Union wish the public to know that they do not throw the blame of their recent complaint on the company, but upon a very versatile executive (on a small scale), a man who is content to receive his own full salary without reduction, and who wishes to put money in his employers' pockets by devising grand schemes for robbing the little boys (who do not get $100 a month) of their hire. This is not the first time this executive Napoleon has tried to make himself indispensable to the company, nor will this be the first time he will prove that he is not as great a worker as he is a schemer. All that the boys want is fair play and a fair chance to live, and, in return, they give honesty, industry and sometimes their health. If the manager wishes to enter into a newspaper controversy with us, we will not fail to give him all the reply he may desire."

A NEW ATLANTIC CABLE.—A letter from Havana dated on the 12th inst. says: A project for laying a submarine cable between Spain and Cuba is awaiting the resolution for its approval by the Minister of Public Works. The company which will own the cable has been constituted under the title of the Spanish-American (Ibero-Americano) Submarine Cable Company. It is proposed to lay the cable over a route that will be divided into three sections, the first of which will unite Portugal with the Azore Islands, a distance of 1,000 miles; the second section to extend to the Bermuda Islands, being 1,700 miles; while the third will terminate at Havana, a distance of 775 miles. The cable will be connected at the Bermudas with the City of New York by a cable of about 750 miles in length. From Havana a line about 390 miles long will be laid, connecting the cable with the Central American lines. The price fixed for messages between Spain and Havana is 1.50 pesetas, or 30 cents a word, the present rate by way of the United States being $1.20 per word. The company petitions the Spanish government to guarantee the annual transmission of 1,000,000 words.

TELEGRAPHY IN BOSTON.—The Boston *Traveller* has been inquiring into the telegraph business of that city, and finds that nowhere has the increase in the telegraphic business been more marked than in Boston. The main office of what was then known as the American Telegraph Company in 1845 was in the present *Traveller* building, at which time one operator was all that was needed to send and receive messages to and from all points. The Western Union Company has now thirty-five offices in the city, and employs about 115 operators, one-half of whom are women. At the main office alone between 15,000 and 16,000 messages are handled daily, besides the large number which pass through the outside offices in the city. Such cities as New York and Washington have six direct wires, with a large number that can be made up in case of necessity. In addition to these, there are in Boston about fifteen private wires to brokers, bankers and others, between manufacturing establishments, commission houses, etc., in the city and a number of the large manufacturing cities.

THE POSTAL COMPANY IN CHICAGO.—The Chicago *Tribune* says: The iron conduit now being laid to bring in the wires of the Postal Telegraph Company through the city, and which is to be utilized for carrying all electrical telegraph, telephone, and power wires under instead of above ground, has made fair progress. More than a mile is now in complete order. The test mile is completed from Thirty-ninth street north to Thirty-third and La Salle, but the conduit is laid as far as Thirty-first street. A temporary building is now being erected at Thirty-third and La Salle streets. This will contain batteries, engines, dynamos, etc., to be used in the practical test, which will be made in about ten days. The distance will be lighted up with Van Depoele lights at every corner and in several buildings. Then there will be telegraphing between New York and Chicago, and telephone tests between Chicago, Cleveland and other cities. The tests to be made will be of the severest character, to show that wires can be placed underground in the large cities at a comparatively small cost of maintenance. The General Manager is pushing the work as rapidly as possible.

A RAILROAD OPERATOR IN A BAD FIX.—A man who lately held the position of night telegraph operator at one of the stations on a New England railroad has related to a reporter of the New Haven *Union* a personal experience which serves to illustrate the responsibility of that class of employés. He was the only man in the depot at night, and his hours were from 7:30 P. M. to 7:30 A. M. One night he dropped asleep at his instrument and the next thing he knew he awoke to hear the rumbling of an approaching train, and his telegraphic call vigorously sounded on the receiver before him. To his dismay he preceived that his right hand and arm were "asleep," as the common expression is, and totally useless, and it was only with great difficulty that he could give an intelligible response to the signal with his left hand and scrawl a brief memorandum of the instructions which followed. However, he did succeed in stopping the approaching train and giving the important orders which he had just received. "But," said he to the reporter, "the affair frightened me so that I determined never to nap any more in that office, and to get off the road just as soon as I could find a decent place elsewhere."

CHEAP TELEGRAMS IN ENGLAND.—The Montreal *Star* says: The British House of Commons has voted in favor of sixpenny telegrams, notwithstanding the opposition of the government. It will be interesting to watch the financial result of the experiment. It will of course lead to an enormous increase in business, and will be a great boon to the public. Sixpenny telegrams are not a new institution in England. The old metropolitan companies used to convey twenty words for sixpence over a comparatively limited area, and found it paid very handsomely. The government took possession of the whole telegraph system of the country in 1868, and subsequently rates were leveled up to one shilling for messages to any place within the United Kingdom, with the exception of an extra charge for delivery by horse express in certain out-of-the-way places in Ireland. The extension of the telegraph system, nearly all over the country, without regard to the probability of remunerative results, was, of course, a great convenience, but the people, who had so extensively used the sixpenny telegrams in the metropolitan district, felt that they were taxed rather too highly for the national convenience. The shilling telegrams did not pay at first, but in 1872 the net revenue from the postal telegraph service was £159,835, and in the year 1879–80 this had increased to £340,942. No joint stock company would be justified in making such an experiment as that adopted by the House of Commons, but there is every probability of the result being as satisfactory as Rowland Hill's penny postage. It is not the business of the government to run a post-office for revenue purposes; its first consideration should be the providing of the most efficient and cheapest service for the public. The incidental fact, however, that the post-office is a source of revenue is none the less gratifying. The popular feeling is almost entirely in favor of a liberal policy for the post-office, and it is a little surprising to find the Government opposing a motion for cheapening the telegraph service.

NEW YORK CITY ITEMS.

Echoes from 195.

Mr. W. E. Van Nortwick has returned from Oil City, Pa.

Mr. C. W. Minier has returned to New York, after a winter in the sunny South.

Mr. John W. Moreland is now in Winslow, A. T., and latest accounts state that his health is much improved.

Dr. F. Bradnack, of the night force, has removed back to Harlem. His address now is 204 East Eighty-second street.

The work of demolishing the Central Cable office building, preparatory to the erection of a larger structure in its place, will be commenced in a few weeks. While this work is going on, the cable department will be re-established in its old quarters at 195.

The printing operators in 195 are Messrs. J. K. Calvert, T. M. Miller, J. L. Edwards, Wm. Blanchard, Theo. Fullon and Jas. Knittle. With one or two exceptions, these gentlemen have been in the telegraph service almost since its inception. The printing operators send and receive on an average 500 messages per day.

The name of Mr. Hugh Wallace as southwestern traffic chief was inadvertently omitted from the article on the Western Union main office in our last issue, as was also the name of the writer of the article, Mr. W. Maver, Jr., of 195.

Cultured witticism:
Boston to New York on the third quad:
"Take out that 100 ohm plug and say when."
N. Y.—"Now."
B.—"Now stick in that other plug in its place."
N. Y. (testily)—"What other plug?"
B.—"Oh, yourself!"
N. Y. (faintly)—"Hi, hi."

On Monday last Mr. A. P. Kranshaar, of 195, received by express a box securely fastened and with several suspicious-looking holes in its sides. Not having expected anything of the kind, thoughts of infernal machines flashed through his mind, and it was with some trepidation that he finally opened it, whereupon he was reassured by discovering that it was only a young but live and frisky alligator about nine inches long, wound in seaweed, which his friend, Mr. H. C. Rath, now in Florida, had sent him as a souvenir. Mr. Kranshaar has sent the memento to a taxidermist.

The Western Union Base Ball Association of 195, of which Mr. A. J. Voyer is president; Mr. E. F. Welch, manager; Mr. C. M. Fulton, treasurer; Mr. W. C. Burton, recording secretary, and Mr. W. T. Killmartin, financial secretary, is in a flourishing condition. It has a roll of seventy-five active and honorary members. The active members are practicing assiduously, and expect shortly to have a first-class nine to meet all comers from similar amateur clubs, those from the telegraphic ranks in particular. As the Buffalo, Chicago and Boston offices are also organizing clubs, the subject is being mooted, with a good prospect of success, of arranging a base-ball tournament, to take place in Buffalo, in which the above and any other telegraphic teams so desiring would compete.

Other City Items.

Trustees of the Central Electric Gas Lighting Company have petitioned the Supreme Court for a voluntary dissolution of the company. The trustees say that the business has not been successful, and that the stock and fixtures of the company are not sufficient to pay all just demands.

A meeting of the stockholders of the Mutual Union Company was held April 18 at No. 135 Broadway for the purpose of ratifying the lease of the lines of that company to the Western Union. There were represented by the owners in person or by proxy 93,340 shares of stock, and the vote in favor of ratification was unanimous.

A fire at the corner of Reade street and Broadway, on April 15, did considerable damage to rubber goods belonging to the Boston Electric Fabric Company, which is about to move into the building. Electric light apparatus of the Parker Electric Light Company, of Little Falls, N. Y., was also damaged.

A company has been incorporated under the style of the U. S. Fire Escape and Fire Alarm Company, for the purpose of manufacturing and erecting a patent fire escape and electric alarm. The officers are: President, James A. Lyon; Superintendent, Fred O. Britton (for many years manager of the Third District A. D. T. Co.); Treasurer, Morgan I. Skiddy; General Manager, W. H. Warburton, and Secretary, John Boyd (late of the American and Manhattan District Companies. The capital of the new company is $200,000, two-thirds of this it is said, has already been subscribed for, and the remainder it is not intended to issue. The offices of the company are 265 Broadway, and in the Garfield Building, Brooklyn.

PERSONAL.

MINNEAPOLIS & ST. LOUIS RAILROAD.—Mr. L. M. Hamilton has been appointed superintendent of telegraphs *vice* Mr. Young.

OSHAWA, ONT.—Hon. T. N. Gibbs died at this place on the 7th inst. He was at one time president of the Dominion Telegraph Co.

CAMDEN, N. J.—Chas. B. Somers of this place has been appointed to the charge of Bridgeton, N. J., office, in place of Miss Mariana Uhlinger, resigned.

DEATH OF AN OLD PIONEER.—V. W. Bullock, of Albion, N. Y., father of ex-Gov. Bullock, of Georgia, died last week at the Kimball House, in Atlanta, at the age of 78. The body was embalmed and sent to New York.

NEWPORT.—Mr. Ike S. Bailey, formerly manager of "P. O." office, Newport, R. I., has resigned to accept position as agent and operator at South Orange, N. J. He leaves behind a large circle of friends, who wish him every success in his new position.

HAS ANY ONE SEEN HIM?—A young telegraph operator named Harris Conn, lately in the employ of the Cleveland & Pittsburgh Railroad, at Wellsville, O., has mysteriously disappeared, apparently without cause. His mother is nearly heart-broken over her son's protracted absence.

THE MUTUAL UNION PRESIDENT.—Mr. John G. Moore, president of the Mutual Union Telegraph Company, is in Washington, adjusting his business preparatory to his departure for Europe. He expects to leave soon to be gone about six months. It is understood that he has made a handsome fortune out of the Mutual Union operations, and probably will not undertake any new business for a year or two.

ST. JOHN, N. B.—Business is getting quite brisk now and a heavy rush is anticipated during the summer. The many friends of Mr. J. R. Henderson will be pleased to learn that he is able to be out, though not sufficiently recovered to resume work. He has been laid up with lung trouble. Mr. B. B. Palmer, of North Sydney, has returned to the cable station, after working a month here. Mr. G. M. Robertson has been transferred to the cable staff, in place of A. D. Skinner, who is receiving Fredericton report during session. Mr. R. A. Mitchell has been transferred from North Sydney to Fredericton during Parliament session.

DIED.

GILMAN.—At Laconia, N. H., April 6, 1883, Ruth W., wife of Mr. Frank L. Gilman, assistant postmaster, formerly operator W. U. Boston office.

CARROLL.—At Columbus, O., April 11, Mr. Frank S. Carroll, of consumption.

ELECTRICAL PATENTS ISSUED.

Week ending Tuesday, April 10, 1883.

Adjustable support for telephonic transmitters; William H. Eckert, John A Seely and Edward A. Eckert, Cincinnati, O. 275,611
Conduit for electrical wires; John F. Martin, Chicago. 275,399
Connection for electric light fixtures; Sigmund Bergmann, New York. 275,749
Dynamo-electric machine; Vincent E. Keegan, Boston. 275,392
Dynamo-electric machine; Chas. J. Van de Poele, Chicago, Ill. 275,549
Electric arc lamp; Joseph B. Allen, Springfield, Ill. 275,345
Electric cable; William J. Philips and George L. Kitson, Philadelphia, Pa. 275,407
Electric cable; Sidney F. Shelbourne, New York. 275,424
Electric arc light; Geo. J. Murdoch, Binghamton, N. Y. 275,510
Electric signaling apparatus; Charles Cummings, Virginia City, Nev. 275,600
Frictional electrical machine; Philip Atkinson, Chicago. 275,347
Flexible electrical conductor; Sigmund Bergmann, N. Y. 275,748
Headgear for switchmen's telephones; Chas. E. Scribner, Chicago, Ill. 275,420
Insulating compound for electric conductors; Sidney F. Shelbourne, New York. 275,422
Incandescing electric lamp; Thos. A Edison, Menlo Park, N. J. 275,613
Machine for manufacturing electric cables; William J. Philips and George L. Kitson, Philadelphia, Pa. 275,408
Mold for insulating subterranean electric cables; Sydney F. Shelbourne, New York. 275,423
Manufacture of incandescing electric lamps; Thos. A. Edison, Menlo Park, N. J. 275,612
Molding bulbs for incandescent electric lamps; Alfred Swan, Gateshead, County of Durham, England. 275,730
Subterranean electric cable; Sidney F. Shelbourne, New York. 275,425
Switch for electric lights; Thomas G. Turner, New York 275,440
Telephone exchange switch; George W. Coy, Milford, Conn 267,362
Telegraph key; Edgar G. Stevens, Cleveland, O. 275,443
Underground conductor; Rudolph M. Hunter, Philadelphia, Pa. 275,387
Underground electrical conductor; John Kruesi, Brooklyn, N. Y. 275,776

BUSINESS NOTICES.

If you want to become a telegraph operator send 25 cents to C. E. Jones & Bro., Cincinnati, for best illustrated instruction book.

THE STEVENS KEY.—The Stevens patent top contact key, the invention of Mr. E. G. Stevens, chief operator in the general office of the New York, Pennsylvania & Ohio Railroad, at Cleveland, is meeting with great success. It is largely used, especially throughout the West, and is highly spoken of by all who have had any experience with it. The key is made by the Standard Electrical Works and is advertised in another column.

The attention of persons interested in local telegraph and telephone organization is respectfully called to the electric lighting system of THE FULLER ELECTRICAL COMPANY, and the practicability of making arrangement with that company for the introduction of its apparatus, either in isolated plants or through the formation of local companies desiring to engage in the business of electric lighting. The specially valuable features of this company's system may be seen by examiuation of its apparatus in Boston, Worcester, Providence, New York City, Brooklyn, Jersey City, Paterson, Philadelphia, Hartford, Lancaster, Scranton, Syracuse, Rochester, Buffalo, Pittsburgh, Wheeling, Steubenville, Xenia, Dayton, Grand Rapids, Chicago, Springfield, Belleville, St. Louis, St. Paul, and many other smaller places throughout the country. Correspondence is invited. THE FULLER ELECTRICAL COMPANY, 44 East 14th street, New York City.

The offices of the United States Mutual Accident Association have been removed to Nos. 320 and 322 Broadway, over the Central National Bank. The new offices are among the roomiest and most conveniently arranged offices in the city, and the various departments of the association are admirably adjusted with a view to securing the prompt, thorough and accurate transaction of all their business. It is but six years since the association was incorporated, and already its business has grown to such proportions as to make the present removal a matter of necessity. The association, it is said, has a membership of over 12,000 scattered throughout the United States and Canada, and a surplus fund is constantly carried in the treasury as a guarantee of prompt payment of losses. A membership in the association may be secured by the execution of a simple form of application, and the payment of a membership fee of $4. No medical examination is required.

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TO INVENTORS.

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References and full information by mail on request. W. B. HALE, Solicitor of Patents. Former First Ass't Examiner in charge of Class of Electricity, U. S. Patent Office. Office, No. 614 F St., Washington, D. C.

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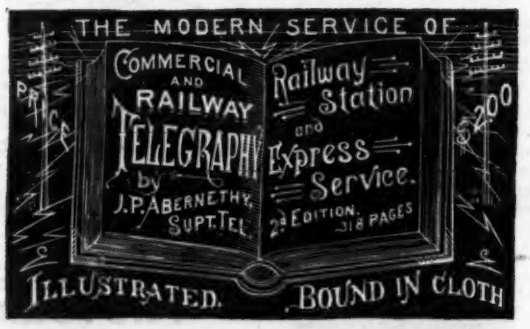

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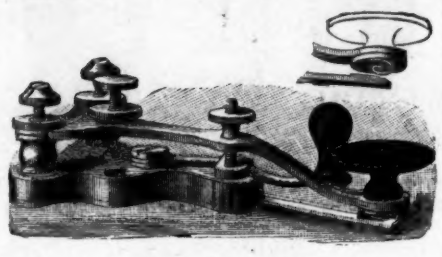

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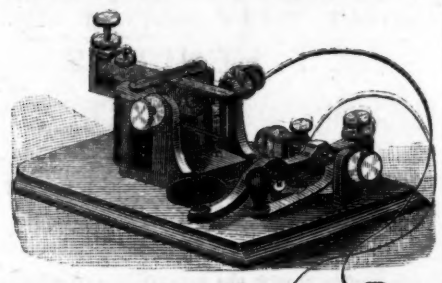

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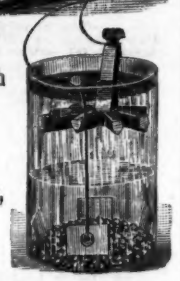

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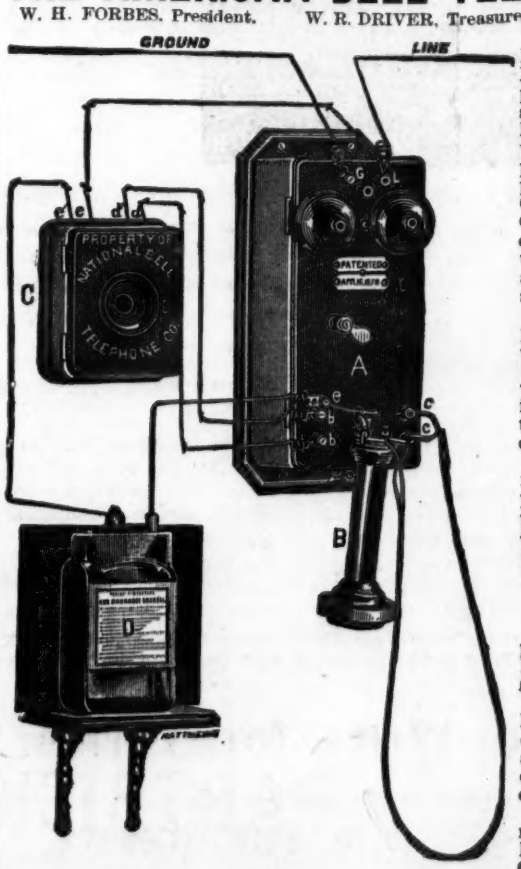

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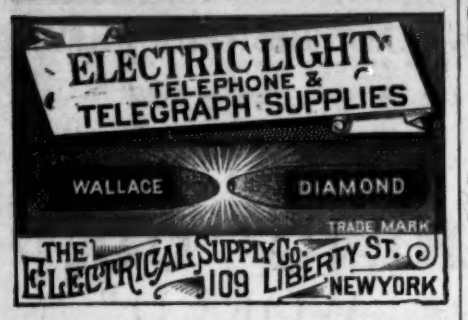

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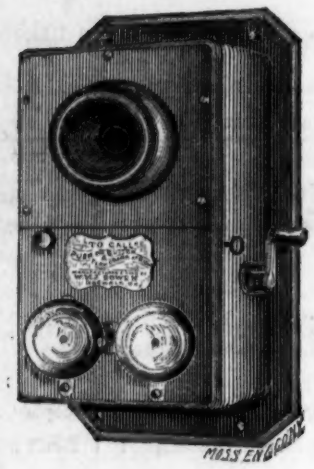

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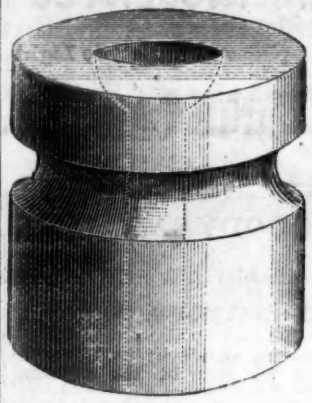

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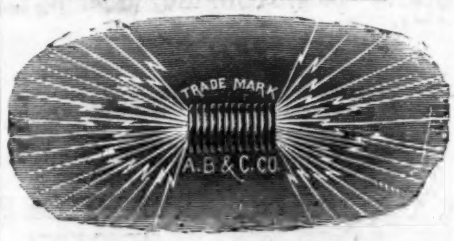

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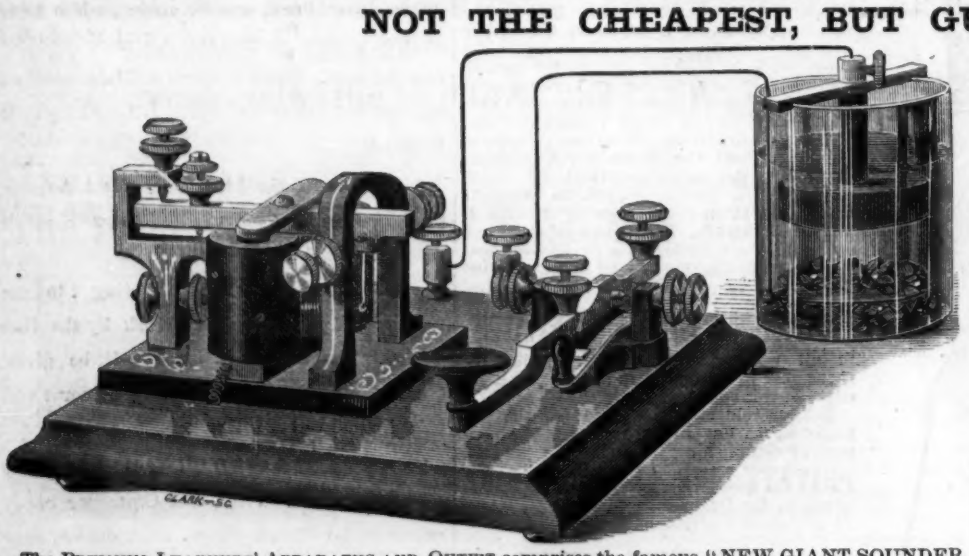

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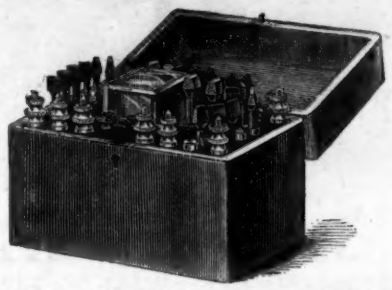

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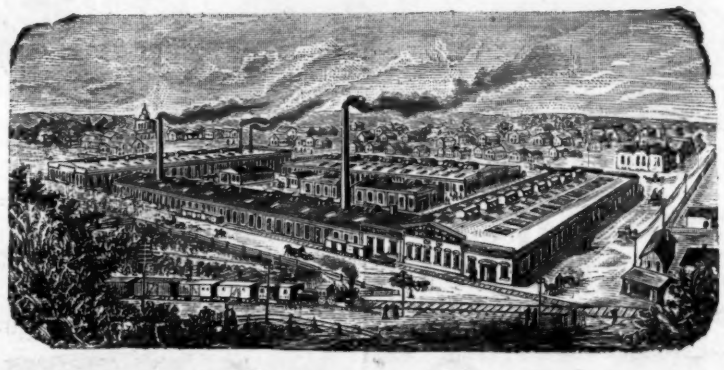

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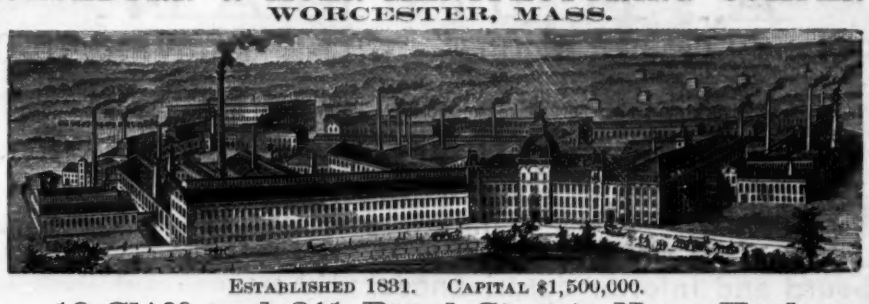

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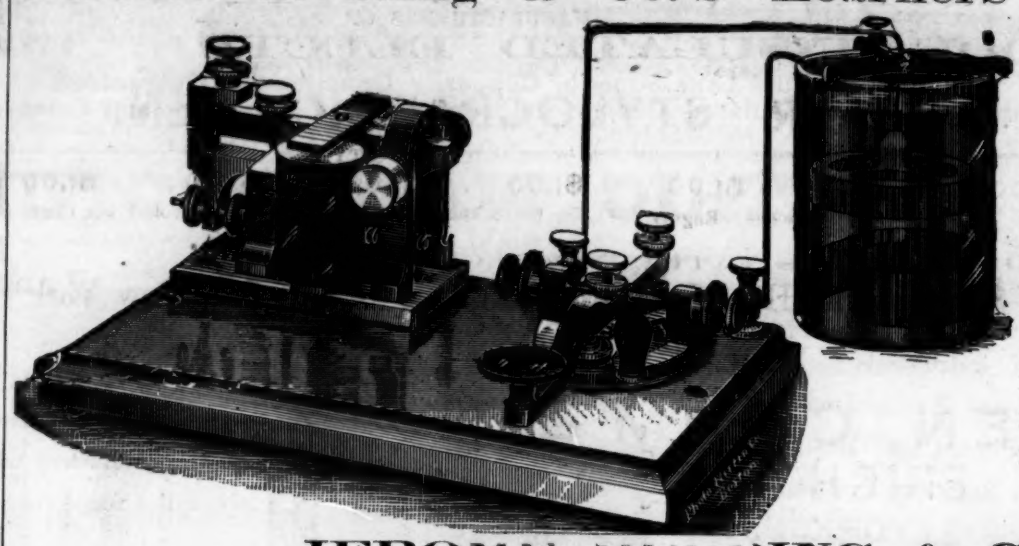

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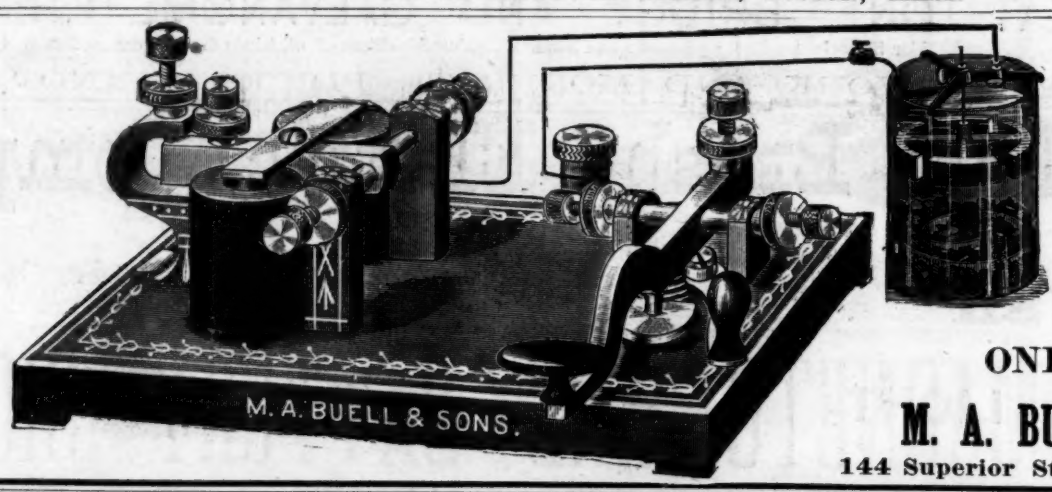

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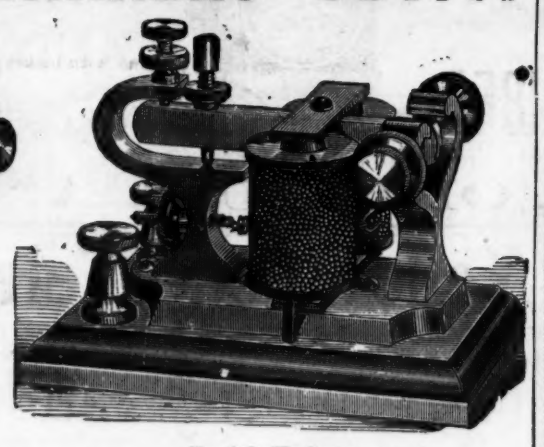

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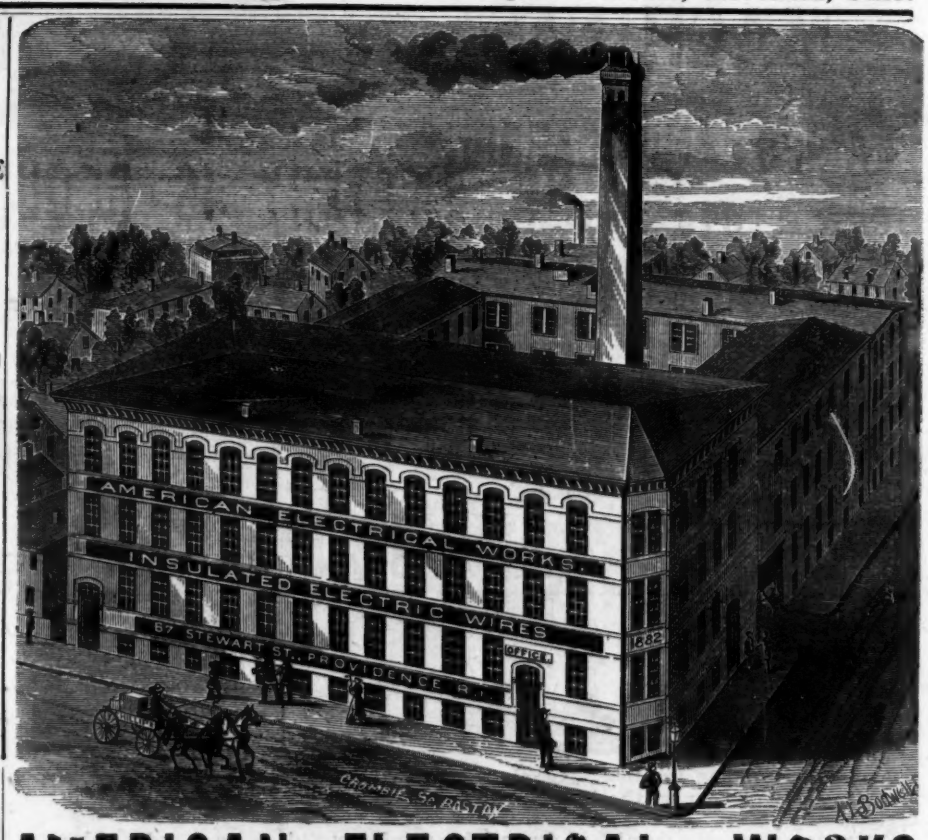

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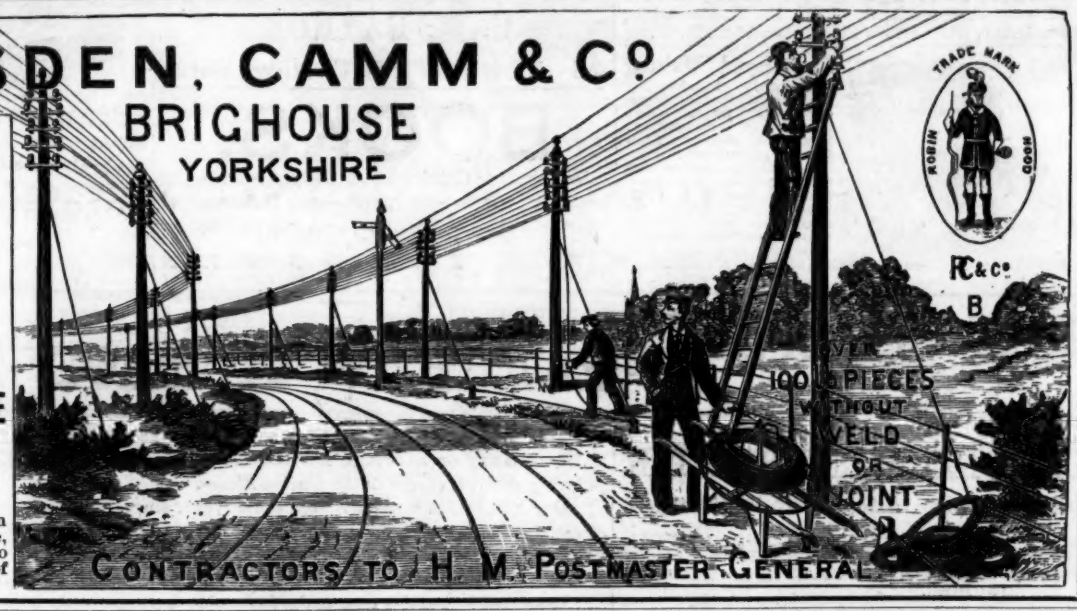

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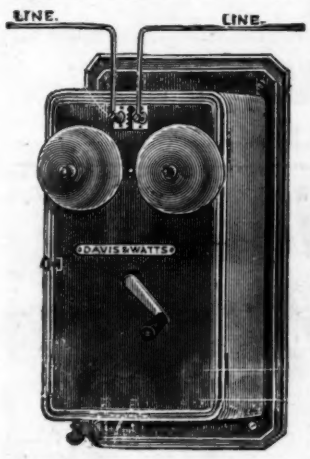

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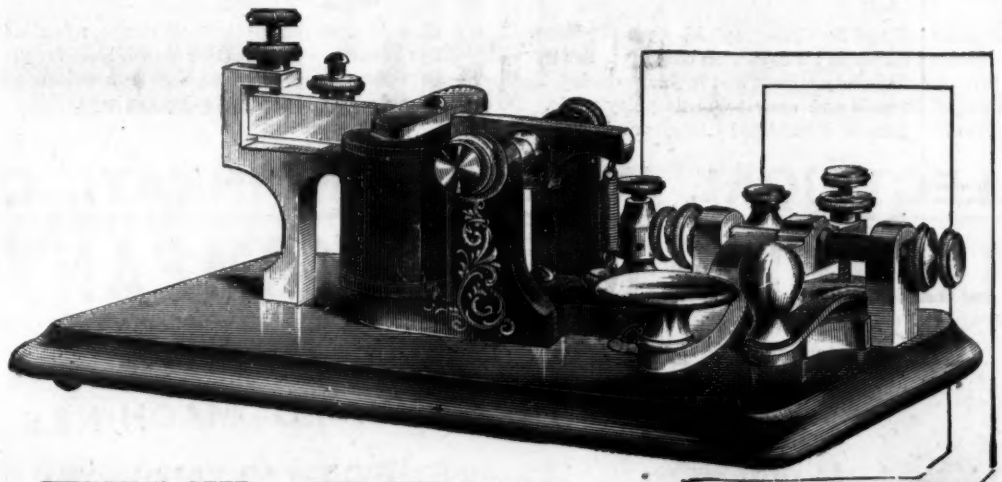

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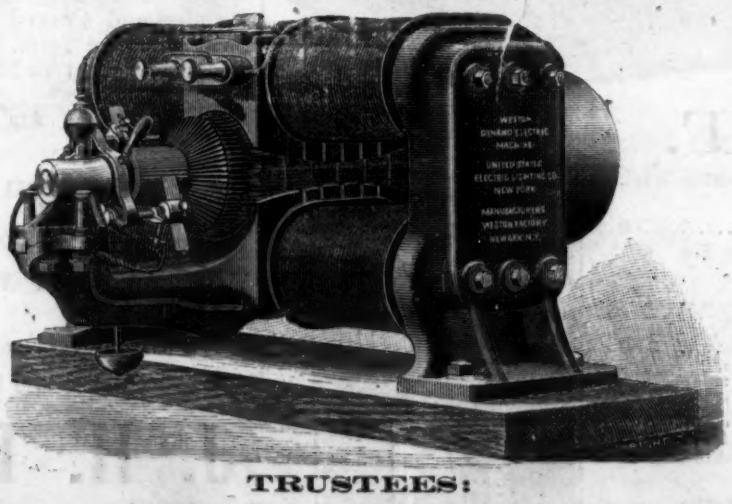

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